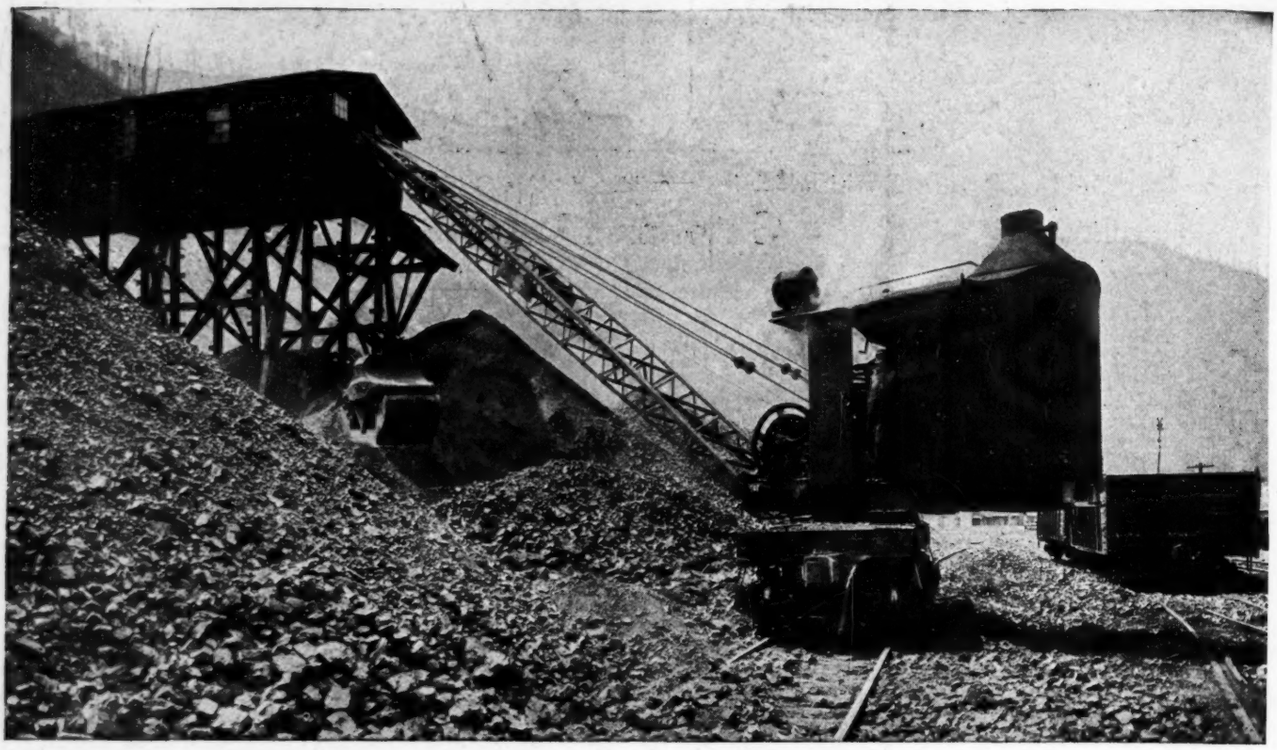
Selecting Equipment for Vertical Shaft Hoisting, p. 581

COAL AGE

McGraw-Hill Co., Inc. With which is Consolidated "The Colliery Engineer" 20 Cents Per Copy

October 18, 1923



"The Cost of Reloading Stored Coal Is a Very Small Item"

This extract from a letter written by the Thurmond Coal Company, will interest coal mine and industrial executives who are studying the economies of storing coal.

"We have used our Brownhoist locomotive crane practically every day for two years for the storing and loading of coal and for the handling of heavy members incidental to our mining.

The Brownhoist has proved exceptionally beneficial to us during periods of restricted car supply, enabling us to operate and store coal on days when other mines in the field, not provided with cars, were idle. For this work the crane has been of inestimable value to us.

We have found that the cost of reloading stored coal is a very small item and as compared with our inability to operate without the crane, it is practically negligible."

The Brown Hoisting Machinery Co., *Cleveland, O.*

Branch Offices: New York, Chicago, Pittsburgh, San Francisco, New Orleans

BROWNHOIST

MATERIAL HANDLING MACHINERY

COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24 NEW YORK, OCTOBER 18, 1923 Number 16

Is Betelgeuse Drawing Nigh?

THE old maxim about the strength of union has never yet impressed coal operators. Apparently it has been all right for labor to unite and strengthen to a point of dictatorship in the industry, but unity of policy and opinion among mine owners has long appeared as distant at Betelgeuse. Its greatest distance may have been attained in Illinois, especially in 1910, when the old single operators' association of that state was shattered by the withdrawal of Southwestern operators who were tired of holding out against striking miners, and made peace—and an association of their own. But today that distance appears to have been reduced to some extent.

There has been no consolidation of the three existing operators' associations in Illinois, but a single policy committee for the three has been set up and endowed with some authority. It will speak for the state. It will deal as one body with the union both outside of Illinois and within. That is, it will perform these important functions unless something happens to cut the sod from beneath its feet. There is no point in claiming that every operator in the state firmly believes this new committee plan is 100 per cent right. Of course there is some skepticism regarding the service the committee can perform, and the plan could be upset in an emergency. But the hopeful thing about it is that a definite step has been taken in Illinois toward consolidation.

Operators in that state should convince themselves of the importance of the step they have now taken. They should review at a glance the costly history of disunion which the coal operators of the whole country have written. They have already reviewed, in certain measure, that cost in their own state and resolved, after a fashion, to avoid repetition. It remains to be seen whether they will cling to that sound policy when a situation arises—as it surely will—calling once more for the well-known but little-used "solid front."

Electrification

SINCE the early nineties we have introduced electric haulage equipment into the coal mines of this country. The electrification of mining machines, pumps and fans came later, and still later hoists and screening equipment operated electrically. Electricity has stolen in on us like a thief in the night, and consequently we have been slow to put it, as it should be put, into the hands of specialists.

Today we are just beginning to organize for effective operation of mines by electricity. We have at last electrical engineers in charge of equipment supported by staffs of varying adequacy. But most electrical engineers still are compelled to put expensive and complicated machinery in the hands of men of little training and even of restricted ability, education and opportunity. Furthermore, the electrical engineer at the mines is not supported adequately by any national society. He needs the help of an electrical organization if he is to obtain the benefit of the experience of others. Rapid progress in any art is attained only by the co-ordinated effort of individuals.

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers is a little broader in its scope than its name suggests, but it should be made national, with a section meeting at various points in West Virginia or in Huntington. Such services as it is already performing would justify the association in becoming the core of a national organization, for its meetings are well attended, its members are hard-working and enthusiastic and the character of its articles and discussions are of a high order. The society with advantage might invite prominent mine electrical engineers to address it, thus benefiting its membership while at the same time spreading a knowledge of the meritorious work it is doing, which is as yet none too generally recognized.

Many general managers and superintendents do not know a good electrical engineer when they have one at their plants. They regard him as a man too often who is making altogether too many demands on the rest of the personnel. He must furnish the electricity for others to use as wastefully as they please, yet he is held responsible for the electrical cost per ton of coal.

To such a man, hedged in by advocates of old traditions, an electrical association national in scope furnishes an opportunity not only to learn new ideas and methods and to see new machinery but to get the honors to which his talents and efforts have entitled him. It is strange that up to the present only West Virginia, Virginia and Kentucky have risen to the point of expression. In other places the electrical engineers are joining omnibus societies, making their addresses before mixed audiences or combining humbly with iron-and-steel men or triennially, quadrennially or whenever occasion serves getting into session as an appanage of the American Institute of Electrical Engineers. Such associations too general in their scope can never afford the technical pabulum and the helpful inspiration which every electrical engineer should enjoy.

IF CONGRESS, in its wisdom, decides to limit the amount of coal produced by limiting the number of mines, how is it going to prevent tremendous expansion of haulage and hoisting at each mine that inevitably will increase the country's volume of coal at the slightest market provocation? This problem of stopping coal-mine expansion is a nice, simple little one. Settling it by act of Congress is comparable to the famous resistance which King Canute set up against the tide of the sea.

Excuses Not Reasons

DRAMATIC and interesting are the references to Herrin in the Coal Commission report to Congress on civil liberties in the coal industry. It would seem an offense aganst good literature to wish that they had been less dramatic, less interesting and more true to conditions. The arguments advanced as explanation for the recent murders are mere dalliance with criminality.

The Commission recites that back at a date not named "Profit was the sole object" in mining. That is an indictment of nearly all enterprise today and of nearly all labor also. Few indeed are the mines and few the factories that are opened without profit as a motive. Also few are the workers who work for service and not hire. The report adds, "The life and health of the employees was of no moment."

Perhaps there was a degree of indifference then in the mines of Williamson County, but there is every reason to believe that the attitude as to life and health was not greatly different from that in other industries in that generation. We do not recall any care for these matters till recent years. As Ida Tarbell well says, accidents and sickness were then believed to be the "will of God" or were dismissed with a shrug of the shoulders and the words, "His turn had to come."

The declaration that "men worked in water half way up to their knees" probably is, in the main, hyperbole. It is true doubtless that working places were wet and probably in traveling along roadways water thus deep might be found and have to be traversed, but a miner could not conceivably undercut his place in such deep water. A pumper might often have to wade water even deeper, often did in other places than Herrin. It did not, however, in other regions move him to murder defenseless men.

Gas-filled rooms and bad ventilation, as the Commission says, also existed and not in Herrin alone. But they do not palliate murder. To argue that they do would be in an officer of law almost equivalent to compounding a felony.

The Commission adds, "There was no workmen's compensation law; accidents were frequent and there was no common ground upon which employer and employees could meet." These conditions do not define either the mines or Herrin. They were universal.

The last complaint is naïvely written: "The average wage of the miner was from $1.25 to $2." If so, they were better paid than the average run of men at that date. In 1892 tannery employees in Pennsylvania were making $1 a day, building houses and saving money. In 1893 a big employer of mine labor was offered the services of Italian laborers for railroad construction at 80c. per day. He refused to take them, arguing that nothing less than $1 was a living wage.

In the early nineties wages were extremely low everywhere, viewed from our standpoint, and the wages in Williamson County—a farming region with wretched farms—must have been low also. The miner had no special grievance. The cost of living and the low scale of comfort excused the low wage and in no sense justify the criminal actions at Herrin thirty years later. Their fathers had, in the matter of wage at least, not eaten sour grapes, so why should their children's teeth be set on edge.

As the Commissioner says, wages are higher today and the union gets the credit. "The workmen believe in the union, for they think it brought them out of a land of bondage into the promised land when their government had been careless or indifferent to their needs."

It is needless to show that all wages, union and non-union, in mining and out of it, in unionized trades and in trades with no union of any kind, have risen considerably since the early nineties. In fact the big increases have come in many cases from a bidding for labor, union men being paid at times more than union rates.

This practice of raising wages would go further if employers did not fear that the union would insist that the special employer or district giving the increase shall continue to pay that increase when business declines and competition becomes sharp. One instance may be recalled where an increase of 3c. per ton given to obtain men has persisted as a differential for over twenty years, making mine operation in that district frequently unremunerative.

Wages are rising partly because money is declining in value and will buy less and partly because the output of the country as a whole per workman employed has increased and the workmen has profited inevitably thereby. Competition for labor, in so far as it has not been restricted by labor trusts—and indeed industrial trusts—has caused wage increases. Where, however, as in the mining industry, a group of workmen has profited for long periods more than others it has been because a union, or labor trust, has caused workmen to pay more for the work of its members than other workmen are paid for their work by the union's members.

The union men, as the Commission says, approve of the union, but we cannot forget that they delight in it and appreciate it because it is their means of overriding other workmen. Capitalists have been known to like a trust because it enabled them to override other capitalists and the consuming public. Still that liking hitherto has not been held a good and substantial excuse for murder by any reputable body of citizens. Certainly no commission of staid and respectable men would ever be found to exalt devotion to a capitalistic trust to a level with patriotism.

On the whole we get more satisfaction from what the union says about the Herrin massacre than can be obtained from the remarks of the Commission. The union says the Herrin murders were not committed by it, for it or for love of it but by Bolshevists who sought to discredit it. Evidently it takes issue with the Commission on two points: First, it says the murders were inexcusable and, second, they were not the work of the union. Obviously the Commission is badly informed. Both operators and the union condemn the murders, and the miners deny that it was done for the union and so remove the one excuse which the Commission generously advances in their favor.

What troubles the observer is, if the men who did the act were enemies of the union "boring from within,' why did the union pay for their defense and work for their release, seeing that the stern hand of the law could be depended upon to remove these borers, if convicted, to places where they would bore no more?

Alas, these dastardly villians who murdered men captured under a flag of truce, it is as useless as it is childish to defend!

THE HARASSED HOUSEKEEPER is inclined to think that the finest sight in the world is anthracite.—*Providence Journal.*

WHEN FRANCE GETS OUT of Germany depends on what she gets out of it.—*Washington Post.*

Selecting Equipment for Vertical Shaft Hoisting*

Greater Necessity for Shaft Hoisting Due to Mining of Deeper Seams—Selecting the Drum Shape and the Type of Electric Drive —Description of Various Types of Hoist Control Equipment

By M. A. Maxwell
Island Creek Coal & Coke Co., Huntington, W. Va.

GREATER demands for larger tonnages of coal together with the working out and consequent abandonment of the old, easier developed mining sections increases the necessity for mining seams at lower levels in both old and new fields. As a result hoisting from shafts becomes more extensive.

All hoisting problems vary with each installation, shaft hoist calculations being highly specific and mathematically more involved than those for slopes.

Whenever the depth from which the coal must be raised is beyond the practical limit for conveyor systems or raising a train of cars by the usual slope methods, it becomes necessary to resort to vertical shaft hoisting. In this event balanced shaft hoisting obviously is preferable. This method of hoisting requires a shaft with two compartments, each containing a cage or skip operated from a common drum or two drums clutched together, so that one cage or skip ascends as the other descends. The old standard size of such a shaft was 11 x 26 ft., but many of the latest shafts are much larger, one recently put down in Wyoming County, West Virginia, being 18 x 36 ft. In addition an air and supply compartment often is provided. An economical and much-used arrangement is a double compartment for the main hoist, a single compartment for a man-and-material-hoisting cage, which usually is balanced by suitable cast-iron counterweights, and a space for air supply.

Usually such a shaft will cost from $200 to $400 per foot of depth, the wide variation in cost being mostly due to the great variation in the amount of water encountered, as well as to the character of the rock.

After determining the location, depth, size and character of shaft, also the number of tons of coal required per shift, the next problem for consideration is the type of hoist to be used. Since steam hoists, used so commonly in the past, have been superseded almost entirely by electrically driven hoists, we will consider only the latter type of drive. We then have two important hoist and electrical details to consider, namely: (1) Type of drum, and (2) type of electric drive and control.

Drums may be of three types: (a) Plain cylindrical, (b) conical, (c) cylindro-conical. On the plain cylindrical type of drum the rope speed increases from zero to maximum and is continued at its maximum until retardation begins, all on the same radius. On the conical type the acceleration begins on the smallest diameter, and continues as the rope winds up to the largest diameter. On the cylindro-conical type, acceleration usually is accomplished while the rope is on the small diameter of the drum, which is long enough to carry the requisite number of turns to complete the acceleration; the climbing of the cone being accomplished in the fewest practicable number of turns, and the balance of the rope being wound on the large cylindrical part of the drum. On this type of drum the acceleration and retardation periods usually are made the same for the sake of convenience.

The proper and most economical type of drum is readily determinable by calculation from the known data for each specific installation, and hoist specialists are available for the prospective purchaser in the organizations of the electrical and mechanical manufacturers of hoist and control equipment. The selection of the proper drum shape is very important, as it greatly influences the load diagram.

Deciding the Method of Hoisting

Before the drum shape and several other details can be definitely decided upon a decision must be made whether the "skip" or the "car-and-cage" system is to be used. In the former, the coal is dumped in storage bins at the bottom of the shaft, and skips holding usually between 8 and 16 tons are hoisted in balance. In the latter, cages holding from one to four cars have been used in this country, the single car cage being by far most common. The arguments in favor of the skip are that on account of large capacity, slower-moving and less expensive hoisting equipment may be used, and that consequently there is less wear and tear, and less repair expense. Advocates of the car-and-cage system assert that the extra dumping at shaft bottom breaks the coal, reducing the amount of lump available for the market, and that the extra cost of underground work, for skips and bins more than balances the extra cost in hoist equipment for the car-and-cage system.

The next important decision is the type of electric drive and control. If conditions demand the use of the skip, or even the car-and-cage system up to a certain rate of hoisting, the geared induction motor drive is feasible. If a rapid hoisting cycle is necessary, the direct-current Ward-Leonard control becomes necessary. The different systems of electric drive are as follows:

(1) Induction motor with:
  (a) Master controller, contactors and secondary grid resistance.
  (b) Primary contactors, and secondary grid resistance.
  (c) Drum controllers and secondary grid resistance.

(2) Ilgner-Ward-Leonard system.
  Direct-current shunt-wound motor operated from motor-generator set, with flywheel, by Ward-Leonard control.

(3) Ward-Leonard System.
  Direct-current shunt-wound motor operated from motor generator set, without flywheel, by Ward-Leonard control.

*Paper to be presented at meeting of West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers, at Huntington, W. Va., Oct. 19 and 20.

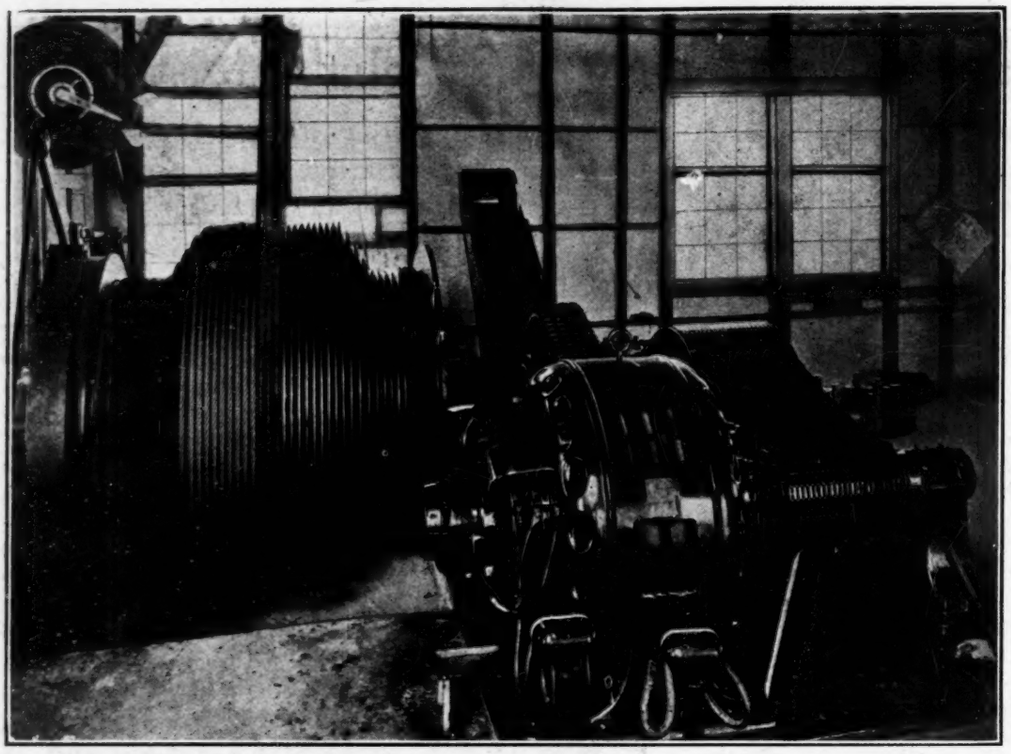


FIG. 1

Cylindro-Conical Drum

This installation shows a cylindro-conical drum driven by a large induction motor. Note the chain drives between the motor and drum.

By far the greater number of installations in this country are of the first class, and run as high as 1,800 hp. in motor capacity. They are simple in construction, comparatively inexpensive, and the availability of alternating-current energy at reasonable rates in almost all coal-mining localities favor its selection.

The disadvantages are inherent, as in secondary resistance control the speed varies greatly with the load for any given resistance value. This prohibits great accuracy of control, and in the case of high-speed hoists, which require great precision and accurate control at the ends of trips, its use is subject to restrictions. Up to 100-hp. it usually is possible to use drum controllers for both primary and secondary circuits, handling reversing primary and secondary currents directly on the segments.

The larger sizes demand magnetic control—that is, contactors are used for both primary and secondary circuits in connection with grid resistance. For the largest sizes, primary reversing contactors are used with a "liquid rheostat," the resistance being in the form of a liquid, usually sodium carbonate, and its value is changed by varying the level of the liquid in a chamber in which are placed electrodes connected in the secondary circuit. Standard voltages for the above equipment are 440 and 2,200, the latter being recommended for 300 hp. and upward.

In the Ward-Leonard system of control the voltage applied to the direct-current hoist motor, and therefore its speed is varied by changing the field strength of the direct-current generator of the motor-generator set which furnishes power to the hoist motor. By reversing the field connections of the generator its polarity is reversed and consequently the direction of rotation of the hoist motor, which latter operates constantly at full field strength.

The excitation for both the hoist motor and the generator fields is furnished by an exciter with voltage regulator control, this exciter usually being direct connected to the motor-generator set. Since only the generator field current is manipulated in controlling the hoist motor speed the currents are small, and a large number of steps easily may be provided.

The principal factors which justify the selection of the Ward-Leonard control are as follows:

(a) Accuracy of control; desirable for high speed hoisting or frequent shifting.

(b) Increased safety in operation.

(c) Higher efficiency at certain duty cycles.

(d) Practicability of limiting the maximum power demand.

(e) Possibility of elimination of gears.

In contrast to the induction motor the speed-torque curves show a comparatively slight change in motor speed over the entire load range on any particular controller point. It is in this respect that its superiority over the induction motor is most valuable. Complete control from standstill to maximum is provided for all values of load. It is rarely necessary to use mechanical braking at all, for in retarding, as the control lever is moved back toward neutral, on account of the inertia of the moving parts, the functions of the machines automatically invert. The hoist motor counter e.m.f. overcomes the applied generator voltage, and becomes a generator, the generator of the motor-generator set becomes a motor, and as such delivers energy into the set until its speed rises slightly above synchronism, when the alternating-current driving motor begins to pump energy back into the supply lines and carries some of the line load. This action brings the hoist drums gently to rest at the stopping point.

If an unbalanced load be lowered down the shaft, it is still unnecessary to use the mechanical brakes, as the descending load acts as a prime mover and sends its energy in to the power lines, falling at a speed determined by equilibrium between its own force and that delivered to the lines. This manner of retardation and the handling of negative loads relieves the hoist mechanism of shock and strain, prolongs its life,

and eliminates brake wear, the brakes being used only for special stops.

When power is purchased under contract carrying penalties for excessive "peaks" or "demands" or generated by the coal company itself under conditions which will not permit the high acceleration peak loads of the hoist, some method of limiting these peak loads may become economically necessary and highly desirable. This may be accomplished by the use of a flywheel direct-connected to the motor-generator set, with a device for automatically varying the speed of the flywheel motor-generator set through secondary rheostatic control of the slip-ring industion-type driving motor. This is the Ilgner-Ward-Leonard system. By its use it is possible to limit the "maximum demand" from the supply circuit to a definite predetermined value for any given hoisting cycle. Whatever energy is required by the hoist in excess of a predetermined maximum limit is taken from the flywheel which gives up a part of its energy as its speed reduces. During periods of lighter power demand the speed of the set automatically increases and energy is thereby stored up in the flywheel and other rotating elements of the set, ready to carry the next peak load.

This peak-limiting control usually is accomplished by the use of liquid rheostatic control of the secondary alternating-current motor currents. Primary current coils are inserted in the main stator leads of the

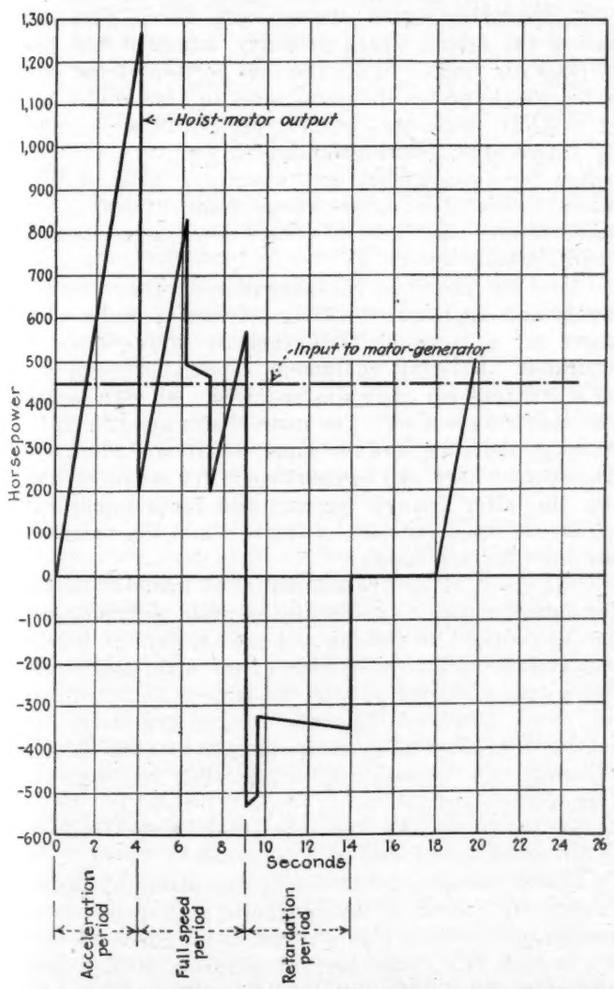


FIG. 2—HOISTING CYCLE OF LARGE MINE HOIST AT MINE NO. 20, ISLAND CREEK COAL AND COKE CO.

Note how the power drawn from the power line does not vary with the peaks on the hoist motor.

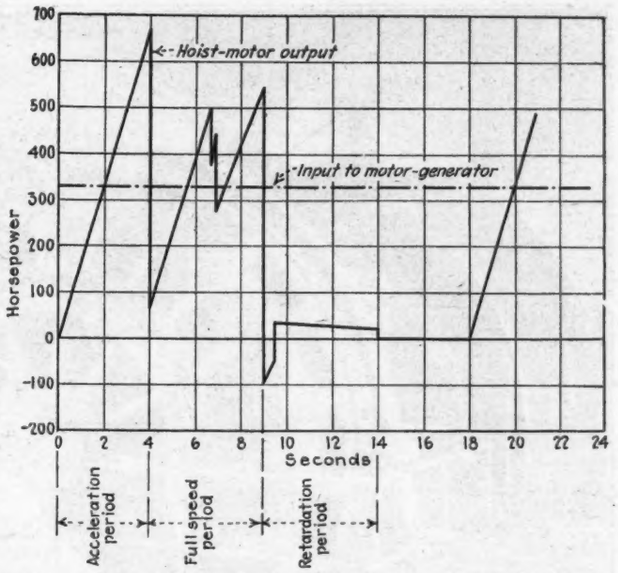


FIG. 3—HOISTING CYCLE OF HOIST AT MINE NO. 21.

The hoisting equipment for this hoist is quite similar to that used at Mine No. 20. The ratio between the hoist motor output peaks and the input to the motor generator set is not so great as that for the hoist at Mine No. 20 because of the slower hoisting speeds and smaller drum.

motor of the flywheel motor-generator set. Secondary coils from the primary current coils connect to the windings of a small "torque motor," which has a long lever arm attached to its rotor, with rheostat electrodes at one end and counterweights on the other. Whenever the input to the main driving motor tends to exceed a certain predetermined maximum value, the torque of this small regulating motor overcomes the counterweights of the moving parts of a slip regulator and pulls its electrodes apart, thereby inserting more resistance into the rotor circuit of the induction motor of the flywheel set.

Since increasing the resistance in the rotor circuit of a slip-ring induction motor reduces its speed, it follows that the flywheel must give up part of its stored-up energy, because its sustaining force has in a manner of speaking slipped out from under it, and this energy thus released by the flywheel carries the direct-current generator over its maximum output peak, which of course is during the acceleration period of the hoist.

Immediately this extraordinary demand has ceased, the driving motor, having been relieved of its load and consequently taking less current from the lines, is speeded up again through the action of the torque motor in bringing the electrodes nearer together, which through weakened torque now permits the weights to overcome it. This speeding up of the main driving motor restores energy to the flywheel. In this it is assisted by the action of the generator during the retardation period because the hoist in effect acts as a motor and drives the flywheel.

This control is so positive and accurate in its operation that when operating on the cycle for which the hoist is designed, and for which the control is adjusted, it is possible to maintain practically constant input to the flywheel set. Five per cent either way from average is guaranteed by the manufacturers. This control also functions when starting the set, thus holding its starting peak within the limit.

In this system it will be observed that the torque required for acceleration is built up gradually from

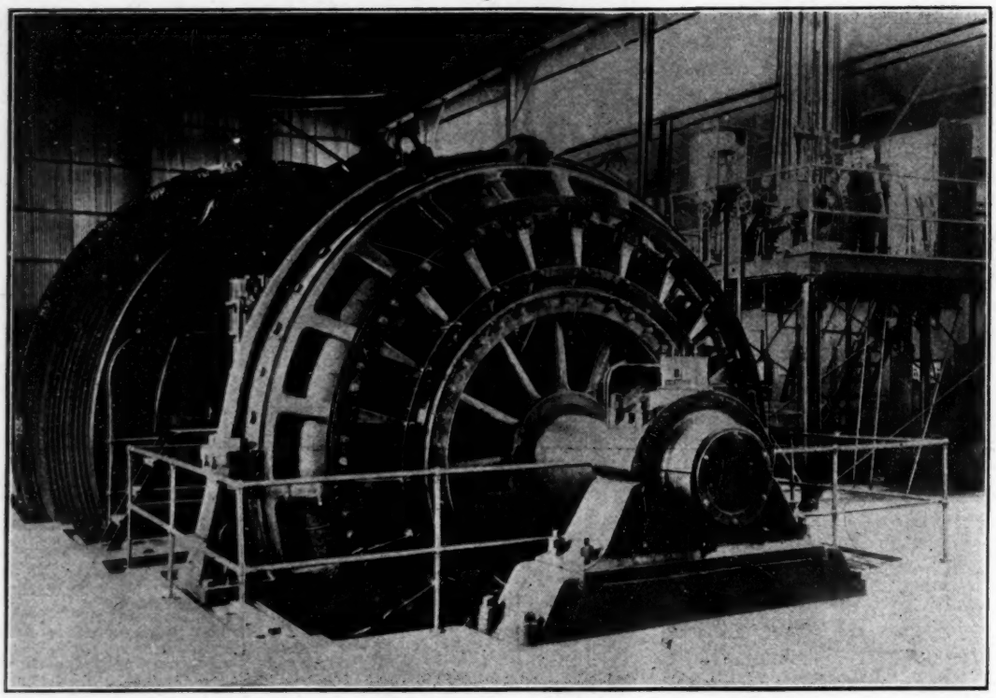


FIG. 4
4,000-H. P. Hoist
On heavy vertical shaft duty. Frequently we think that all large motors are made for operation on alternating current, but here is one that operates on a large direct-current hoist.

zero to normal by varying the voltage so that the required power for acceleration is much less than in the case of the direct-connected or geared induction motor drive, where the power is thrown on in full force and remains so during the entire acceleration period. This characteristic permits the operation of a large hoist from a small power station, which must supply a steady voltage for other loads.

In ordinary practice, by the installation of suitable apparatus, the "maximum demand" can be held to less than one-half the hoist motor's acceleration peak. Aside from a financial saving thus effected, in the power bill, an important result of this leveling out of the hoist load upon the power lines is the elimination of violent fluctuating voltage surges upon the supply lines. If, as is often the case, the mine developments are located at some distance from the power company's step-down substation and the same power lines carry rotary-converter loads, such fluctuations seriously affect the conversion, causing severe variation in the direct-current mine voltage.

All the above systems are equipped with safety devices of the most positive action. Due to the cooperation between hoist and electrical manufacturers the complete hoisting equipment may be made practically "foolproof," even to the cages or skips, which stop instantly by gripping the guides in case of cable breakage.

Ward-Leonard systems, which do not include the use of flywheels, are driven either by synchronous or squirrel-cage induction motors, choice being based on considerations of first cost, power-factor regulation desired, pull-out torque, etc. The general scheme of control is similar to that of the Ilgner-Ward-Leonard system, excepting that, no flywheel being used, the slip regulator is unnecessary.

The Island Creek Coal Co., with mines at Holden, Logan County, W. Va., has installed during the past year a total of four shaft hoists, two for coal and two for men and materials. A brief description of them may prove interesting.

The famous Island Creek seam lies in a huge syncline on a part of the property. Above creek level on the adjacent lease to the south it dips several hundred feet, appearing again above creek level part way across the Island Creek property, where it has been worked for years. Since the low portion of the seam is from eight to ten thousand acres in area and is from 6½ to 7½ ft. thick, the company desired to work it over its entire area. Borings indicated two very favorable points for development, one toward the head of Whitman's Creek, at an approximate depth of 300 ft., the other toward the head of Trace Fork at a depth of approximately 200 ft.

Since the proven areas showed somewhere between eighty and one hundred millions of tons of minable coal, plans for a large ultimate capacity were considered desirable. Hoisting equipment capable of raising at least 500 tons per hour was required. At each location two shafts were sunk. The main shafts are 12 x 27½ ft. with circular ends, and the supply shafts are 12 x 29½ ft. The former have two compartments for balanced hoisting, the latter a single compartment for a supply cage, a narrow space for counterweights, and the balance of the area for air supply.

On account of the special quality of Island Creek coal for domestic use, it was decided to avoid as much breakage as possible, so the car and cage system of hoisting was chosen, each compartment of the main shaft carrying a cage equipped to hold one mine car of two and a half tons' capacity. The cage is arranged to tip automatically at the top, so as to dump the car without its removal, thus saving time in unloading and wear and tear on the cars.

For the man-and-material hoists, herringbone-geared plain cylindrical drums of a diameter of 6½ ft., driven by 200-hp. induction motors were found suitable, and the control equipment is full magnetic with primary contactors and secondary grid resistances. Since the Trace Fork man hoist was put in operation it has raised approximately 10,000 tons of coal per month, pending the completion of the main hoist installation, in addition to handling an immense amount of material used for development, including the removal of slate and lowering

of masonry material for the finishing of the main archways at the bottom of the main shaft.

The selection of the main hoists called for thorough investigation during which it developed that we could not hope to attain the rapid hoisting cycle necessary for the required output through the use of alternating-current control. Another serious disadvantage with this type of drive and control would have been the impossibility of limiting our maximum demand, which with its cost of $1.80 per kilowatt per month based on the five-minute integrated peak, would have been expensive and would have had a bad effect on our rotary installations.

The final hoist calculations showed that the duties required the use of the Ilgner-Ward-Leonard system, with the use of cylindro-conical drums of 7 ft. at the small diameter and 10 ft. at the large diameter driven by direct-current motors, direct-connected to the drum shafts. The following duty cycles were calculated, and the tabulation will show the conditions to be met at each location. System of hoisting: Balanced, double compartment, car and cage.

DUTY CYCLES

	Mine 20 Whitman's	Mine 21 Trace
Total vertical lift	370 ft.	280 ft.
Weight of cage	12,000 lb.	12,000 lb.
Weight of car	3,400 lb.	3,400 lb.
Weight of coal per trip	5,000 lb.	5,000 lb.
Rope diameter	1¼ in.	1¼ in.
Weight of rope per side	1,110 lb.	840 lb.
Maximum speed of drums	82.5 r.p.m.	63 r.p.m.
Time to accelerate	4 sec.	4 sec.
Time at full speed	5 sec.	5 sec.
Time to retard	5 sec.	5 sec.
Time to dump and load	4 sec.	4 sec.
Maximum number trips per hour	200	200
Short tons per hour	500	500
Assumed WR^2 of drums	500,000 lb.	400,000 lb.
Turns on small diameter of drum	2.75	2.1
Turns on cone	3	3
Assumed mechanical eff. hoist part	80 per cent	80 per cent

The complete hoisting cycle is 18 seconds, including the rest period, which fulfills the capacity requirements. WR^2 represents the inerita of the moving parts of the hoist, sheaves, etc., and is expressed in foot pounds, and must naturally be taken into consideration in figuring the required power for acceleration.

In the accompanying load diagrams, Hoist A, located at Mine No. 20, represents that at Whitman's Creek; and Hoist C, located at No. 21, represents that at Trace Fork. They afford an excellent illustration of the great difference in power requirements for the same capacity in coal taken from different levels.

Though the total lift at Mine No. 20 is only 90 ft. greater than that at Mine No. 21, the distance being 370 ft. and 280 ft. respectively, it will be observed that the momentary acceleration peak at Mine No. 20 is 1,270 hp., while at Mine No. 21 it is only 670 hp. This is on account of the fact that in order to obtain the same time for the hoisting cycle it is necessary at Mine No. 20 to accelerate from rest to a rope speed of approximately 2,600 ft. per minute, in exactly the same number of seconds that a rope speed only 1,900 ft. per minute is reached at Mine No. 21, these figures being the maximum rope speeds respectively on the two hoists.

It may be of interest to know that the selection of the hoist and control was influenced by considerations of economy in electrical energy, there being a saving of approximately 20 per cent in the kw.-hr. required for hoisting one ton of coal, the power consumption being 0.49 kw.-hr. at Mine No. 21, and 0.60 kw.-hr. at Mine No. 20.

The distribution voltage of the power supply over the Holden property being 6,600 volts, 3 phase, 60 cycle, the motors of the motor-generator set operate at line voltage, the final capacities of the motor and generator for the main hoist being as follows:

	Mine No. 20	Mine No. 21
Capacity 6,600-volt driving motor	450 hp.	350 hp.
Capacity D.C. shunt wound generator	700 kw.	400 kw.
Weight of steel plate flywheel	13,000 lb.	9,500 lb.
Capacity 250-volt exciter	19 kw.	19 kw.
Voltage of D.C. generator	400	260
Capacity D.C. hoist motor	900 hp.	475 hp.
Synchronous speed of set	900 r.p.m.	900 r.p.m.

Commutating poles insure sparkless commutation on both generator and motor at all loads. Since the sole work of the generator is to drive the hoist motor or to be driven by it, any voltage may be chosen provided the amperage is held within reason. It was possible to use standard frames for both generators by using 400 volts at Mine No. 20 and 260 volts at Mine No. 21.

The supply hoists and rotary substation equipments are in separate rooms in one building, while the motor generator sets and main hoists are in separate rooms in another building.

The power circuit supplying the two developments is in the form of a closed loop about eight miles in length, and of No. 00 copper from a step-down substation at Whitman's Creek Junction. Switching towers at each mine permit feeding from either end of the loop. Separate circuits are taken off the towers through separate disconnecting switches to the main hoist, supply hoist, and a local substation. The towers also are equipped with choke coils and surge lightning arresters.

Germany Has Limited Reserves of Lignite

THE German publication *Braunkohle*, in the issue of May 26, gives the following record of the reserves of lignite in Germany, basing it on the Geologic Service of Prussia, which finished its labors on this survey in December, 1922. That survey reports the reserves, actual and probable, not exceeding 1,000 m. or 3,281 ft. in depth, to be as in Table I.

TABLE I—PROBABLE RESERVES OF COAL NOT EXCEEDING 1,000 M. IN DEPTH IN THOUSANDS OF TONS

Districts	Operable by Open Cut	Operable by Underground Mining	Total
Lower Rhine	2,315	1,382	3,697
Westerwald	.....	105	105
Upper Hesse	1	7	8
Lower Hesse	37	124	161
Brunswick-Magdeburg	299	1,311	1,610
Thuringia-Saxony	2,733	1,704	4,437
Lower Lausits	568	4,656	5,224
Upper Lausits	875	947	1,822
Oder	40	431	471
Totals	6,868	10,667	17,535

In determining the list of the beds operable by stripping, all those beds are included the thickness of the overburden above which lies between one and two and a half times the thickness of the utilizable part of the coal bed. An allowance for loss in mining of 30 per cent for work above ground and of 50 per cent for work below ground has been made.

If to the figures are added those from other states than Prussia, the total reserve will be nearly 21,900,000 tons. It is well to add that this reserve represents only 2.8 per cent of the total combustible mineral reserves of Germany when taking into consideration the calorific power of the respective minerals.

IN THE EVENT that Governor Pinchot would like to take another conciliation job or two, the world was never in position to offer him a larger assortment.—*New York Evening Post.*

How Permanent Records of Mechanical and Electrical Equipment May Be Kept*

Advantages of Equipment Records and the Co-operation Needed to Maintain Them — How Different Types of Machinery Are Classified — Permanent Inventory Made Possible — Records as a Guide for Purchasing New Equipment

BY J. H. EDWARDS
Electrical Engineer, Elkhorn Piney Coal Mining Co.
Huntington, W. Va.

THE necessity of having complete descriptive records of all machinery and equipment in use and held as spares at every coal mine is obvious. However, it may be interesting to enumerate some of the advantages of such records.

When a new man, such as a superintendent, mine foreman, mine electrician or chief electrician is employed, these records will afford him an easy and quick method of learning with just what equipment he will have to deal. When, as often happens, the manufacturer's nameplate is lost, that valuable information is preserved by the record.

When repair parts are ordered the records save the time and energy of making a trip to the machine to get a copy of the nameplate information and eliminate mistakes, for guesses are not made and no errors arise such as are to be expected when an attempt is made to read dirty or battered nameplates.

The records afford a place to note important changes to parts of a machine, which affect the proper ordering

NAME PLATE DATA

(Copy items in same order—include repair parts—omit patent dates)

(No name plate on boiler)

Equipped with Foster Superheater No. 34344

Built by Power Specialty Co.

Superheater is made up of 25 sections or units

Boiler tubes arranged 13 rows high, 7 rows of 15 each and 6 rows of 14 each.

The 21 extra tubes on hand 11/29/19 are 18' 11-3/4" long and measure 3.97" OD and 3.65 ID.

Note: Fire brick arch replaced 2-18-21, used fire brick which were left over from original power house construction; cost Material $200.00; labor carpenter $8.37; brick mason 16 hours $20.00; common labor $12.20; miscellaneous $4.92; Total $243.49.

Note: Detrick arch installed 7-20-22. P. O. 17190, dated 5/31/22. Arch $274.00, freight on arch $13.36, 1000 fire brick $48.00. Other material including 400 Lbs. of J-M No. 31 high-temperature cement $25.69, labor $62.98, total $424.03

FIG. 1—BOILER REPAIR DATA

Costs of maintenance and record of materials and labor are easily kept on each piece of equipment.

NAME PLATE DATA

(Copy items in same order—include repair parts—omit patent dates)

The Jeffrey Mfg. Co.,
Columbus, Ohio.
"Arcwall"
Coal Mining Machine
Class 29 Form B
No. 12202 Date 7-23-20

(Controller for main motor)

The Jeffrey Mfg. Co.
Columbus, Ohio.
Starting Box
Class 21 Form A
Volts 250
Cat. No. 91909

(Controller for small auxiliary motor)

The Jeffrey Mfg. Co.,
Columbus, Ohio.
Starting Box
Class 11 Form 934-J
Volts 250
Ohms _____

When ordering parts for this machine, always give this number, 12202
The Jeffrey Mfg. Co.,
Columbus, Ohio.

FIG. 2—CLASS "C" RECORD

Complete nameplate data are quickly available for ordering any part for this coal-cutting machine.

of repair parts. They also afford a place to record the date when the equipment was purchased, the order number, the name of the company from whom it was purchased, and its original cost.

In case of a breakdown records enable those in charge to make a quick and sure survey of the situation and to determine the possibility of transferring other equipment so as to relieve the situation. The records, if properly maintained, are a perpetual inventory of the mechanical and electrical equipment.

Where a company operates several mining plants from a central office the equipment records reduce the time and expense of traveling which would otherwise be expended in obtaining information such as a good record should provide. The records also prevent the loss of equipment lent to neighboring mines.

The system of records used by the Elkhorn Piney Coal Mining Co. was devised to suit the location of the mines with respect to the district and general offices, also upon the method of management of the company.

*Abstract of paper prepared for meeting of West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers, to be held Oct. 19 and 20, at Huntington, W. Va.

NAME PLATE DATA

(Copy items in same order—include repair parts—omit patent dates)

DIRECT CURRENT MOTORS

Comp. Wound — No. 1229309
Type MC — Form A 20 — Speed 1150
Volts 230 — HP 5 — Amp. 19.5
General Electric Co.

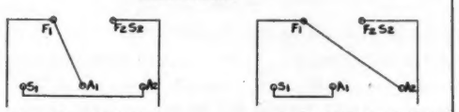
Caution: Use no lubricant on the commutator

PART NUMBERS

Brush	Cat. 1331765
Com. End. Brg. Lng.	" 1330169
Pulley " " "	" 1330169
Armature Coil	Spec. 59479A
Main Field Coil	" 185907.1
Com. " "	" 185897.1

When ordering other parts always give serial number of machine.

Connections



Clockwise Rotation. Counterclockwise Rotation

Has four brush holder studs, and one brush to each. Brushes are beveled on each end, 7/16" x 3/4" x 1-5/8" short edge x 1-7/8" long edge, with 3-1/2" shunt. Commutator is slotted slightly.

FIG. 3—D. C. MOTOR DIAGRAM

Aside from nameplate data this record shows the important motor connections.

In consequence, a brief outline of these conditions may be necessary. The various mines are grouped into several divisions situated in eastern Kentucky and southern West Virginia; the offices of the manager and also the electrical engineer are located at Huntington, W. Va.

The main offices, including that of the purchasing agent, auditor and vice-president in charge of operations, are at Milwaukee, Wis. Each of the larger operations has a man whose duties include those of chief electrician and master mechanic of that division. This arrangement calls for three complete copies of each set of records, one for the chief electrician at the mines, one for the electrical engineer at Huntington and one for use in the main offices at Milwaukee, Wis.

The electrical engineer is in charge of the equipment records and therefore is responsible for the proper recording of all new equipment purchased and also for making any alterations or additions to the record sheets of old equipment. The permanent copies of record sheets of all new equipment are prepared in his office, which also sends out all instructions regarding any changes to be made on the records.

This arrangement requires the co-operation of the chief electrician at the mines, who must keep the electrical engineer advised of any changes which are otherwise unknown to him. This method makes it possible to have a uniform system of records at each operation, also to maintain the three copies of each record for the three respective offices.

The record sheets measure 8½x11 in., that is, of letter size. They are punched for filing in standard loose-leaf binders. This overcomes the common objection to the card system, where it is so often found that for certain items of equipment the cards do not afford sufficient space to hold all the desired data. Also, the fact that the sheets are filed in ring binders makes it more likely that the records will be kept in proper index order. A further advantage of the large sheet over the card is that several copies of a record can be made at one typing.

On the front of each sheet is a form suited to the equipment being recorded, and on the back are spaces for nameplate information. By thus providing for a complete copy of the nameplate data the record sheet will afford information which a fixed form cannot always provide. The front upper right-hand corner has a space headed "Equipment," in which is inserted in one or two words the type of equipment: for example, "DC Motor" or "Transformer." This makes it much easier to locate the record sheet of any particular class of machine.

Near the top of the form is a space headed "Descriptive Name," opposite which is inserted in a few words a description making it possible to quickly identify a certain piece of equipment from others of about the same type. Space is allowed for purchase order number, date and cost. This information often is required by the operating department, and is invaluable to the auditing department as a perpetual inventory. Several spaces are allowed for recording transfers from one operation to another. At the bottom is a space headed "Out of service or destroyed." Notations are made in this space whenever machinery is sold, destroyed or scrapped.

These forms divide into eight different classes, namely B, C, E, F, L, M, P, and S. The principal items of equipment which are recorded in each class are as follows:

Class B—Steam boilers (all types except those on steam-railway locomotives), feed water heaters, steam separators, feed water meters.

Class C—Coal-cutting machines.

Class E—Alternating- and direct-current motors, transformers (not including instrument transformers), generators (not including direct-connected units), converters, motor-generator sets, switchboard panels, large automatic reclosing circuit breakers, automatic

NAME PLATE DATA

(Copy items in same order—include repair parts—omit patent dates)

Sirocco
American Blower Co.
General Offices
Detroit, Mich. U.S.A.
Works at
Detroit, Mich. & Troy, N. Y.
Fan No. 0-27283

Note: Feb. 1, 1921, the fan motor is now running with resistance all in, or at slowest speed and the input is 17.25 KW with the fan producing 58,500 Cu. Ft. of air at the intake. Water gauge 0.7 inch.

Fan house is equipped with steel reversing doors for changing direction of air current through mine.

Following are manufacturer's specifications:

157 RPM	75,000 cu. ft.	1½"	water gauge,	28 HP
212 "	150,000 "	2"	" "	74 "
272 "	180,000 "	4½"	" "	142 "

FIG. 4—HOW THE FAN PERFORMS

Manufacturer's rating and test data give valuable information on the capacity and limitations of the fan and anyone can determine without difficulty when the fan has become too small for its work.

motor starters, compensators, electric drills, electric solenoid brakes, spare armatures.

Class F—Mine fans, blowers.

Class L—Mine locomotives.

Class M—Miscellaneous; shop machinery, rock crushers, coal crushers, oil tanks and oil filters, drum hoists, traveling cranes, cement guns, mechanical furnace stokers, sawmill equipment.

Class P—Pumps (deepwell, reciprocating, centrifugal, etc.); air compressors, steam turbines, stationary steam engines, turbo-generators (direct-connected, engine-driven), generators.

Class S—Steam-railway locomotives, steam-driven concrete mixers, steam-driven well-drilling machines, locomotive cranes, steam shovels, compressed-air locomotives.

Each item of equipment is assigned a record number, and each operation is assigned a certain range of available numbers in each classification. This provides against duplication of numbers, therefore making possible the use of the same record plates and record numbers even though machinery is transferred from one division to another.

A small plate—1 in. wide by 2½ in. long—carrying the initials of the company, the class letter and the number, is attached to each piece of equipment. The small-sized plates were adopted in order that they could be readily attached to the smaller items of equipment, such as portable electric drills, as well as to the larger machinery. The plates are stamped by hand, using $\frac{5}{16}$-in. steel letters and figures.

Form CH 77 — Form for "CLASS M" Equipment.

No. 1 DIVISION _____ MINE.

ESTIMATED VALUE

Equipment Pipe Machine

$ _____ Date _____ Record No. M-155

$ _____ Date _____ Mfgrs. Serial No. None

$ _____ Date _____ Date This Record 9/14/19

Descriptive Name Forbes #98 1-1/4" to 6" pipe threading machine

Type _____ Direct, Chain Gear, Belt Connected _____

Size _____ Type Motor _____ Make _____ H. P. _____

Capacity 1-1/4" to 6" pipe Volts _____ R.P.M. _____ Ser. No. _____

Rated Speed _____ Type Starter _____ Make _____ Ser. No. _____

Complete Description Forbes patent die stock for hand or power.
Figure 2282. #98.

Use Pipe threading Location Machine Shop

Purchase Order No. 191 Date 1/2/14 Cost New Used $270.75

TRANSFERRED TO	DATE	ORDER NO.	PRICE	USE—REMARKS

Out of Service or Destroyed Sold, Statement No. 20, April, 1921.

This sheet is to be Sent with Machine upon Transfer. (OVER)

FIG. 5—MACHINE-SHOP EQUIPMENT

It is easy to tell whether or not this machine can handle a job before shipping the material to the shop. Note that the capacity record definitely tells the story.

FORM CH 76 — Form for "CLASS P" Equipment

No. 3 DIVISION Vulcan MINE

ESTIMATED VALUE

Equipment Mine Pump

$ _____ Date _____ Record No. P-87

$ _____ Date _____ Mfgrs. Serial No. 15888

$ _____ Date _____ Date this Record 1-25-21

Descriptive Name Deming triplex 5½ x 8 horizontal mine pump

Type Reciprocating Drive Steam, Air Elec. Motor Elec. Motor

Fig. No. 70 Direct, Chain Gear, Belt Connected Gear

Dia. Water, ~~Air, or Steam~~ Plunger, ~~Cylinder~~ 5½ Stroke 8 Rated Steam Pressure _____

Size Suction 4" Discharge 3" No. Steam Cylinders _____ Bore _____ Stroke _____

Simple, Duplex, Triplex Triplex Size Intake _____ Exhaust _____

No. Stages 1 Type Governor _____ Valves _____

Single Double Acting Single No. Fly Wheels None Dia. _____ Face _____

Piston Plunger Type Plunger Type Motor RC 29A Make GE H. P. 10

Packed Inside, Outside End Outside Center Outside End Volts 230 R.P.M. 1150 Ser No. 1187507

Rated Strokes Per Min. _____ Type Starter Auto Make ECAM Ser No. 2451608

Rated R. P. M. Crank Shaft ~~Driven Pulley or Gear~~ 57.46 Mounted on Truck Yes Gauge 36"

Rated Gallons Cu. Ft. Free Air Per Min. 138 Height above Rail 49½ using 9½" wheels

Plunger, or Lining Bronze, Cast Iron Steel, Cast Steel Bronze Hoist Dia. Drum _____ Capacity _____

Manufactured by The Deming Co., Salem, Ohio.

Use For mine drainage Location Warehouse-to be installed in mine

Purchase Order No. 14183 Date 3-10-20 Cost New Used 1090.90

Date Received 1-22-21 Freight $64.95 not included in above cost.

TRANSFERRED TO	DATE	ORDER NO.	PRICE	USE—REMARKS
Division No. 1	6-29-23	18928	872 72	

Out of Service or Destroyed _____

This Sheet is to be Sent with Machine upon Transfer (OVER)

FIG. 6—PUMP SHEET

Here is an example of how transferred material is recorded. The location of each piece of equipment is positively known, not guessed.

They are attached by means of round-head drive screws, size No. 10, $\frac{3}{8}$ in. long. These screws are driven with a hammer into an untapped hole which has been drilled to a size slightly smaller than the screw. The hardened screw in entering cuts a spiral thread and, therefore, cannot be easily removed, as the head of the screw has no slot to afford a purchase for a screwdriver. It was found that this method of attaching the plates was a considerable improvement over the old method of tapping the holes and using machine screws.

Fig. 1 is an example of how important changes to equipment are noted on the back of a record sheet. In this case it is information regarding the date and cost of installation of new furnace arches under a 400-hp. Edgemoor boiler. An example of a record sheet requiring sufficient space for the data contained on four manufacturers' nameplates, on one piece of equipment, is shown in Fig. 2, this being the record of a Jeffrey arcwall mining machine.

Fig. 3, which is the back of a record sheet of a 5-hp. direct-current motor, shows how the diagram of external connections has been copied from the manufacturer's nameplate. Referring to Fig. 4, you will note

NAME PLATE DATA

(Copy items in same order—include repair parts—omit patent dates)

The Deming Company,
Manufacturers
Salem, Ohio
Fig. 70 Size 5½ x 8"
Pump No. 15888

Note: Gear reduction motor to pump crank shaft is 20.013 to 1.
Motor pinion 20 teeth, 3-1/4" face, 1-5/8" bore, 3/8" x 3/16" keyway, 3 pitch.
Intermediate gear 79 teeth, 3-1/4" face, 2" bore, 1/2" x 1/4" keyway, 3 pitch. Intermediate pinion 15 teeth, 3¼" face 2" bore, ½" x ¼" keyway, 2½"pitch.
Crankshaft gear 76 teeth, 3¼" face, 2½" pitch, has a large bore and is bolted to crank disc of crank shaft.

FIG. 7—BACK OF PUMP SHEET

Important gear data are shown complete. In consequence there is no likelihood that a gear will be purchased that is either too small or too big. Incorrect pitch is a frequent cause of broken shafts.

the manufacturer's guaranteed performance of a mine fan. By being on the record sheet, this data will be preserved where it will be most convenient to locate.

Fig. 5 shows the record sheet of a pipe-threading machine which was sold; a notation to that effect has been added to the bottom of the sheet on the line headed "Out of service or destroyed." The mine pump, Fig. 6, was transferred to another operation. This transfer is indicated in one of the spaces below the heading "Transferred to." Fig. 7, which is the back of the record sheet of this same pump, indicates how information regarding the gears and pinions has been included.

No matter how complete a set of equipment records may be they will not be used to the best advantage unless they are properly indexed. The index for the above record system was given particular attention. A regular printed form, of the same dimensions as the record sheet, is used. Fig. 8 is a sample of the index of Class C equipment at operation No. 4. Opposite Record No. C-3 will be seen notes indicating that this mining machine has been transferred to another operation. Opposite Record No. C-12 are notes showing that this mining machine has been scrapped. The items C-36 and C-59 were originally recorded at another operation and then later transferred to operation No. 4.

These last items are spaced so as to allow room for any other numbers which might be transferred to this operation in the future. It was formerly mentioned that each operation was assigned a certain range of numbers in each class in order that there might be no duplicate numbers. This is illustrated by the items C-36 and C-59, which were transferred from operations where the ranges allotted included these numbers.

INDEX TO MACHINERY EQUIPMENT RECORD. No. 4 DIVISION. CLASS C PAGE 1

NOTES	RECORD NO.	DESCRIPTION	MAKE	SIZE	SERIAL NO.	REMARKS, TRANSFERRED TO, ETC.
	C-1	Mining Machine, Shortwall	Goodman	12AA	2186	
	C-2	Mining Machine, Shortwall	Goodman	12AA	2184	
*	C-3	Mining Machine, Shortwall	Goodman	12AA	2235	To Operation #1, June '19
	C-4	Mining Machine, Shortwall	Morg-Gard.	SA 600	4424	
	C-5	Mining Machine, Shortwall	Goodman	12AA	2507	
	C-6	Mining Machine, Shortwall	Goodman	12AA	2241	
	C-7	Mining Machine, Shortwall	Goodman	12AA	2460	
	C-8	Mining Machine, Shortwall	Goodman	12AA	2234	
	C-9	Mining Machine, Shortwall	Morg-Gard	SA 600	4427	
	C-10	Mining Machine, Shortwall	Goodman	12AA	2561	
**	C-11	Mining Machine, Shortwall	Goodman	12AA	2459	
	C-12	Mining Machine, Breast	Jeffrey	17A	7070	Scrapped, Nov., 1919
	C-15	Mining Machine, Shortwall	Goodman	12AA	2197	
	C-36	Mining Machine, Shortwall	Morg-Gard	SA 600	3986	
	C-59	Mining Machine, Breast	Jeffrey	14 A	2909	

* TRANSFERRED TO ANOTHER DIVISION
** DESTROYED, BURNED, ETC.

CLASS C PAGE 1

FIG. 8—INDEX SHEET FOR CLASS "C" EQUIPMENT

Proper filing is highly necessary, otherwise a perfectly recorded piece of equipment may be overlooked when making use of the records.

KEEPING TRANSFER RECORDS

Fig. 9 illustrates the form of record sheet used for each mine locomotive battery. Although the battery record serves as an inventory of the types of batteries in use, its main purpose is to afford a means of determining the actual service cost per year of the various makes and sizes of batteries. This experience serves as a valuable guide in the purchase of renewal batteries. These battery records are not kept as a part of the regularly indexed equipment record because, unlike other equipment, batteries have a life averaging only one to four years and consequently must be renewed much more frequently than the other mechanical and electrical equipment.

Location .....

Trade Name of Battery.....Type.....

In Use on Locomotive: Record No.....Serial No.....Make.....

In Use on Locomotive: Type.....

Serial No.....

No. Cells.....No. Plates.....

Capacity in Ampere-Hours.....

Capacity in Kilowatt-Hours.....

Guaranteed Life.....

Efficiency .....

Connectors .....

Jars .....

Ribs in Jar.....

Date Left Factory.....

Date Received at Mine.....

Date Put Into Service.....

Original Cost Delivered.....

Date Taken Out of Service.....

Months Life at Mines.....

Months Actual Working Life.....

Credit Received:

For Return of Scrap Battery.....

For Failure to Meet Guarantee.....

Net Cost After Credit Deducted.....

Net Cost Per Year Life at Mines.....

Net Cost Per Year Actual Working Life.....

Replaced By .....

Dates, beginning and ending, of continuous periods of one week or more when out of service:

FIG. 9—STORAGE-BATTERY SERVICE RECORD

From this sheet the life of the battery can easily be determined and future purchases economically guided.

What the Exhibitors Had to Show at American Mining Congress and National Safety Council

Electric Safety Cap Lamps of High Candlepower—Means for Self-Rescue—Steel Car for Anthracite Region—Mechanical Loading—Safety in the Presence of High-Voltage Electric Current

NOTABLE both as to the number of its exhibits and their scope was the Annual Exposition of Mines and Mining Equipment at Milwaukee, Wis., in connection with the annual convention of the American Mining Congress, Sept. 24-29. Much of the equipment and many of the devices were not by any means new to the industry. Only the newer ones have been selected for description in this article. The Mine Safety Appliances Co. exhibited its new Edison safety cap lamp in which the electrolyte is kept from escaping by valves which are closed by the shutting of the battery-box cover. This provision prevents the escape of the electrolyte, so that even with the lamp reversed and shaken none of the fluid escapes. This new lamp gives three times the light of the older model of the same lamp, and the bulb is so mounted that the rays of light are entirely unobstructed.

The lamp weighs 5 lb. 3 oz. and gives an average light flux of 9.67 lumens, or a total of 116 lumen-hours during a period of 12 hours burning. The mean candlepower of the light stream from the headpiece over a period of 12 hours is 2.67. The average current consumption of the bulb for the same period is 1.06 amperes.

Have Over Twice Previous Power Capacity

The cells have 2½ times the ampere-hour capacity of those they replace and yet occupy approximately the same size of casing. The headpiece is sealed so that the miner cannot open it and is so designed that bulb replacements may be made without disturbing or touching the reflector or removing the lens. The bulb has a concentrated filament and consumes a relatively high current. The lens is laminated, being made up of two thin pieces of glass with celluloid between them. The cord is of the spiral type protected by a heavy rubber coating.

SELF RESCUER FOR MINES

Experiments during the war led to the invention of this self-rescuer, which if devised earlier might have saved many lives.

The voltage of the battery at starting is 2.81 and aften ten hours is still 2.28. The candlepower at the center of the light stream is 5.12 and at an angle of 32½ deg. 4.10.

Another exhibit by the same company was a self-rescuer. In earlier days it was thought necessary to give the mine worker an apparatus that would supply him with oxygen. The new self-rescuer does not afford him anything but merely intercepts all the many poisonous gases and fumes with which the baleful afterdamp is filled, except carbon monoxide. This latter gas it combats by converting it into carbon dioxide, which is harmless. This self-rescuer, which may have to be kept or carried for long periods of time without its bearer having any use for it, is placed in a box having a cover which is provided with a seal of soft lead of such a character that the cover readily can be torn off by the mine worker and the self-rescuer taken from the box.

It is necessary thus to protect the apparatus, as the entrance of moisture, if long continued, would destroy the power of the Hopcalite, by which the monoxide is converted to dioxide. All the mine worker has to do after he has opened the box in the manner already described is to adjust the nosepiece and put his mouth over the rubber connection provided for that purpose. The self-rescuer weighs 13 oz. including the box and can be carried in the pocket or on the belt, for it measures only 4x8 in. over all.

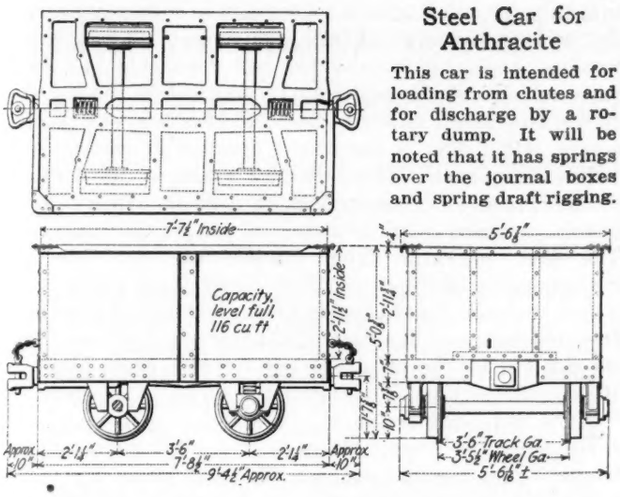
A shotfirer in Mine No. 49 of the Central Coal & Coke Co., Pittsburg, Kan., recently became involved in an explosion resulting from a blown-out shot. He had a self-rescuer with him, fortunately, and with its aid found his way to the surface.

At its booth in the exposition the Mine Safety Appliances Co. also showed a timber jack with a screw stand. This stand supports a Y which is used for holding up a cross timber till it can be secured in place. The device is said to save labor and reduce accidents.

The Lorain Steel Co. exhibited the Lehigh Coal & Navigation Co.'s new car, all of steel, with spring draft gear, single springs over journal boxes and intended for rotary dumping. In general it is of the pattern usually associated with the anthracite region. Thus it is 5 ft. ⅜ in. high; and why not, seeing it is to be loaded by chutes? Its over-all width is 5 ft. 6⅞ in. and over-all length 9 ft. 4½ in. It weighs 5,600 lb. when empty and it holds 116 cu.ft.

On the stage thundered a Joy loading machine, now equipped for use with both caterpillars and wheels for use as the operator may wish. The caterpillar runs between the tracks. Should you desire to put on wheels, put two ties between the tracks behind or in front of the caterpillars and move toward them. The caterpillar will climb on them and lift the machine so far above the rails that wheels can be slid on the axles. As soon as the caterpillars have passed the inserted ties, the wheels, if put on, will engage the track so that the loading machine will travel on the wheels instead of on the caterpillars and can be taken in this manner to the next working place, provided that is the preferred way of traveling.

Gages of 42 in. and upward are equipped with de-



Steel Car for Anthracite

This car is intended for loading from chutes and for discharge by a rotary dump. It will be noted that it has springs over the journal boxes and spring draft rigging.

tachable track wheels for transporting the machine from one working place to another. On narrow gages the caterpillars are set to the track gage to permit the calks provided in the tractor treads to function as wheel flanges restraining the machine so that it is compelled to travel along the mine track rails.

Where the cross-sectional area of roadways is restricted it becomes necessary to use on storage-battery locomotives smaller batteries than are well suited for a day's work, and in other cases where the work is particularly heavy the cells do not retain enough of their strength to keep the locomotive traveling at speed the day long. At such times the batteries have to be boosted or charged. The change as usually performed is an operation involving time and labor, and the Mancha Storage Battery Locomotive Co. has devised a way, which was exhibited at the company's booth in the Exposition, whereby the change can be made in three minutes.

A pedestal track is placed at such a level that when the locomotive strikes it the battery in its case is lifted from the chassis of the locomotive and supported so that the latter can be backed out of position. The raising of the battery is performed by an inclined plane, the track on which the battery runs during the first part of its travel being inclined uphill. From another similar track the locomotive thus stripped can obtain another battery and go again to its work with all the vigor of a fresh charge.

The battery left on the pedestal track can be charged without removal and will be ready to be loaded on the chassis as soon as the locomotive has demounted the other battery. It is urged that this ability to transfer the battery promptly adds 100 per cent to the work that the locomotive may be expected to perform.

At the booth of the Falk Corporation was shown a flexible coupling invented by James Bibby, of England, and first manufactured in that country. It is known here as the Falk-Bibby coupling. With any shaft it is important that the bearings be all in line. When a shaft has only two bearings good workmanship should provide that need, but with more bearings than two the alignment may not be so perfect. Even though that alignment may have been exact when the shaft was installed the supports under the bearings may settle and as a result the shaft may be subjected to additional stresses and the bearings to increased friction, thus causing a continuous loss of power and undue wear.

For this reason alone a flexible coupling is desirable, but it has the further advantage that any shocks received by the operating parts are not transmitted to the motor. A coupling should not transmit torsional oscillations, and between shafts there should be no end thrust.

The Falk-Bibby coupling consists of two flanged steel disks, one keyed to each shaft, and a tempered steel spring encircling both and forming a continuous cylindrical grid and a shell. On the outsides of the flanges are pitched cross grooves. In these the spring is placed, connecting the two disks but in an elastic manner. The grooves in the disk widen inward toward each other, so that the spring fits closely in them only at their outer ends. This widening is in the form of an arc of definite radius. It is made by machines specially designed for that purpose and the radius of the arc is such that each bar of the spring can be bent around this radius without exceeding a fixed safe stress.

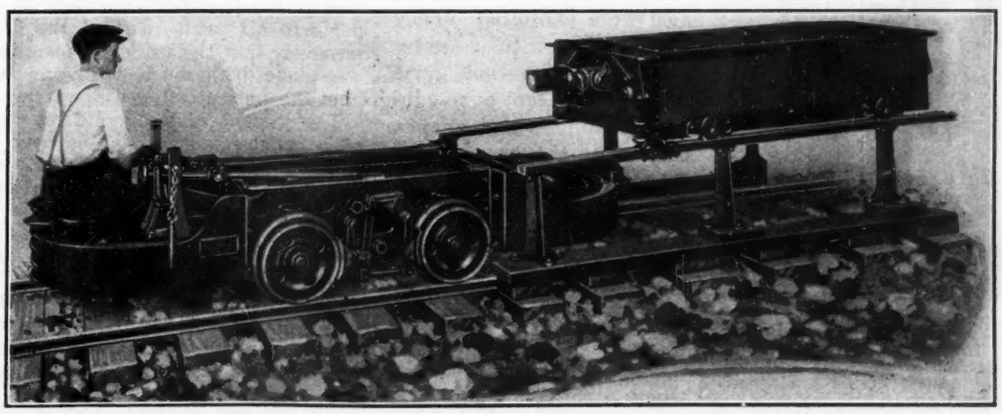
Consequently under heavy loads the spring members become supported along the sides of the grooves, thereby automatically shortening the spring without increasing the stress. Under extreme overloads the springs are in shear and can resist many times the load for which the coupling is designed.

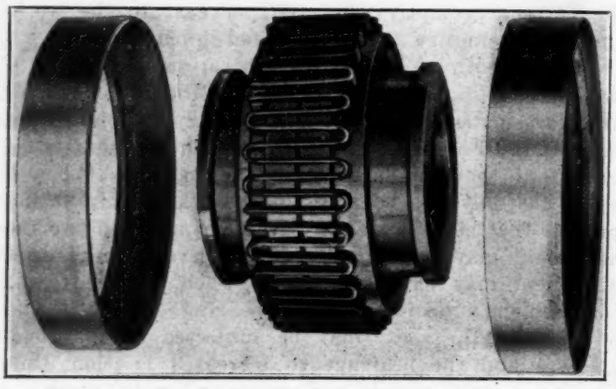
One of the most active pieces of machinery in the exposition was a Hoar "Baby" shovel for underground loading. In the hands of an operator it went through the motions of dipping, crowding, hoisting, swinging and dumping with astonishing agility and much sputtering of compressed air. This machine, well known for years in hard-rock regions, is entering the coal field as a serious contender wherever a mine is equipped with compressed air. It is exceedingly compact.

A medium sized type—shovel No. 2—needs but 7 ft. of clearance, top and sides, can clean up an area 14 to 16 ft. wide and is said to be able to load 200 tons of

Taking on a Live Battery

A locomotive may be good for the day's work even when the battery is entirely outclassed. This is why means have been provided, as shown here, to remove the battery with minimum loss of time and replace it with one having a full charge.





FLEXIBLE COUPLING REDUCES STRAIN AND FRICTION

The two shafts to be connected have disks which are slotted and in the slots are laid a spring which connects the disks. As the slots do not fit tightly over the full depth of the spring, the attachment is elastic and shocks are not transmitted from the machinery to the motor.

coal in an 8-hour shift with a good turn of cars. The machine can be motor equipped, but more headroom would be necessary for its operation.

The Hoar Shovel Co., of Duluth, makes the shovel in a larger and a smaller size than the one displayed. The smaller one is a marvel of compactness, operating in a space measuring but 5 ft. 6 in. but with a breast capacity of 12 ft. The total weight of all three types is small—6,300 lb., 6,000 lb. and 5,700 lb. and any one of them can quickly be disassembled to be lowered or hoisted through a 42x42-in. shaft.

A spring reel for power or light cable was shown by the Appleton Electric Co. In the smaller sizes this device has its best coal application in the mine-repair shops. By its use a lamp, drill, or any portable tool can be carried around the work, only the length of cable necessary being paid out by a ratchet arrangement inside the housing of the cable reel, which latter is fastened at the electrical outlet. This device is expected to reduce the wear on cables and keep troublesome lengths of it out of the way.

At the Twelfth Annual Safety Congress, held in the Statler Hotel, Buffalo, N. Y., Oct. 1-5, a small exhibit was provided. W. H. Salisbury & Co., Inc., presented an extremely satisfactory line hose to take the place of the rubber blanket in protecting the lineman. This hose requires no clamps and the far end can be run out on the line beyond the reach of the lineman; a patented locking device keeps the hose everywhere around the electric conductor. It is as easy to detach as to apply.

SAFETY LADDER

Ladder accidents are not specific to the coal industry, but they cause accidents nevertheless.

Linemen's rubber gloves also were exhibited. They were made with a pure-gum center, the whole glove being 95 per cent pure rubber. Seamless and pliable, they meet the need of the lineman when working in difficult places and handling many tools.

The Dayton Safety Ladder Co. presented a line of ladders unusually light and readily collapsible but also more than usually stiff when erected. There are said to be 20,000 stepladder accidents in industry yearly, so the need for safer ladders is obvious. A large, safe-working platform is provided and even this has side rails, which not only add security but stiffen the ladder. In working about power houses and electrical equipment a safe, stiff ladder is one of the greatest of needs.

The Foamite Firefoam Co. ran a film of its method of fighting fire. Foamite can be used on electric arcs but the company is not pressing its use for that purpose. The first discharge from foamite firefoam fighting equipment is likely to be little other than water. In a few seconds the character of the discharge changes. In consequence if the first discharge is not directed on the arc but on the floor, the results with even 8,000 to 10,000 volts will not be dangerous provided the operator has the usual protection.

However, the Foamite firm is still advocating carbon tetrachloride for that purpose, that gas being a powerful dielectric. The value of foamite for putting out fires in oil tanks is unequalled. In a heavy wind the foamite, depending on a froth that cannot be blown away, works better than any mere gas, however heavy.

Another fire-fighting and fire-preventing medium is carbon dioxide. It is being used for playing on electric fires and experiments are being made to use it in transformers in place of air, as it is a protection against fire not only directly but indirectly also because the oil in the presence of dioxide will not oxidize and lose its dielectric qualities.

Mills Beat Mines at Bethlehem Steel Meet

As the result of a series of spirited first-aid contests in which for a while it looked as if the coal miners would be victors, the Saucon mechanical department of the Bethlehem Steel plant took first place, and Bethlehem was hailed as the winner Oct. 5 at the Broadway Auditorium, Buffalo, N. Y., on the closing day of the National Safety Council's meeting. Earlier, however, four teams of the Marion division had held an elimination contest at Barrackville, W. Va.; the Preston division's ten teams had met at Oak Park, W. Va., and eliminated all but one team; the Ellsworth teams, thirty six in number, had assembled at Ellsworth and by trial had selected two teams; the five Slickville teams had similarly met and ascertained which was the best. Johnstown, which had eleven teams; Wehrum, which had five, and Heilwood, which had twelve, had each selected by contest its crack team. In consequence there were eight representative mining teams which were all sent to Buffalo for the final and semi-finals.

The judges in the final round placed the Bethlehem plant first, Ellsworth No. 1 second, Lebanon (mechanical department) third, and Wehrum fourth. The averages attained by the various teams in the final contest were not published. One coal-mine team in pulling a patient off a live wire let him fall back on it twice, and one of the men in the first-aid team then trod on it in his anxiety to perform his part. One of the doctors present remarked, however, that the work of rescuing the man from the wire was done with much skill, and he could not understand how the patient slipped from the loop.

The patient certainly did his part under the rules and made no resistance to falling back onto the wire. To what extent this accident affected the averages of the team is not known. In the finals a layman and a doctor judged each event.

The winning team gets $400 and holds the Bethlehem trophy for one year; the second team gets $200; the third, $80; the fourth, $40. Each team contains eight men. The mine corps were trained by J. V. Berry, chief of the safety and first-aid department. J. O. Durkee is chief inspector of mines. At the intermission between the finals and semi-finals a mine-rescue group of ten men gave an exhibition of apparatus work.

Technical Discussions Elicit Deep Interest at Milwaukee Convention of American Mining Congress

Churn Drilling in Strip Pits—What Can Be Done to Get Larger Coal —Saving Effected in Spare Parts—Battle Between Alternating- and Direct-Current—Standardization—Fire Doors vs. Reversible Fans

EXCELLENT attendance marked the meetings of the Open Forum of the convention of the American Mining Congress at Milwaukee, Sept. 24-29, especially in view of the fact that every section exceeded its time, and arrangements had to be made to continue in another room the holding of one section during the session of the one that succeeded it.

D. E. A. Charlton, assistant business manager, *Engineering and Mining Journal-Press*, presided over the discussion on "Churn Drills vs. Air Drills for Strip-Pit Work." Mr. O'Connor said in this discussion that churn drills making 6-in. diameter holes and driven by one man were and had been for some time displacing jackhammer drills in the Mesabi region. It was not necessary to shoot a preliminary shot so as to chamber the hole made by the churn drill for it was always of ample size and that was well because chambering made an initial shattering that could not fail to have a deleterious effect when the final shot was made.

Mr. Gardner, of the Sanderson Cyclone Drill Co., said that while six years ago the Mesabi region had but 5 or 6 churn drills, it now has 150, evidencing the inevitable displacement of percussive by churn drills wherever soft material had to be shot. Mr. Rhodes added that the large hole was, as Mr. O'Connor said, the great desideratum as it enabled a large charge to be inserted without chambering and thus shattering the ground.

Shooting so as to Obtain Lump Coal

Notable among the discussions was one on "Means of Securing Co-operation from the Miner in Using Explosives That Will Produce a Maximum Quantity of Lump Coal," which was introduced by H. C. Adams, president, Peerless Coal Co. This was the principal feature of the session under the chairmanship of N. S. Greensfelder, editor, *Explosives Engineer*. Mr. Adams is operating in the No. 5 seam in central Illinois. The coal is not undercut by machine but is blown from the solid.

Mr. Adams stated that the men at the mines were no longer miners of experience but mere diggers. They had no desire, what is more, to produce large coal. Fine coal shoveled more easily than large. On the other hand the operators were entitled by contract to have the miners use due care in mining so as to provide a large percentage of lump. That was set forth in the agreements as a duty, the union having inserted that clause at the demand of the operators at the time when payment was made on a run-of-mine basis instead of on a lump basis, removing thereby the anxiety of the miner to produce large coal.

Mr. Adams said that he had believed that he could obtain instructors in mining who could induce his men to abandon their evil practices, which he believed were due to lack of training as much as to indifference, and in many cases resulted in loss to the miner, for the shots did not do what he desired of them and at the same time used an excess of powder, for which the miner had to pay. His superintendents, however, advised him that any such attempt to modify the miners' methods would be ineffectual. The miners insisted that C.C. powder was too slow. The company contended that even C. powder was too fast.

Mr. Adams said he had sought help from the Department of Mines and Minerals of the State of Illinois and had been advised that two companies, the Silver Creek Coal Co. being one of them, had reduced screenings 10 per cent by instructing its miners. The department did not see itself able to do anything to prevent improper shooting of coal but urged on Mr. Adams that the law made it a duty of the management to supervise the placing of holes—a contention that had not occurred to him and which he had not yet investigated. Mr. Adams said that his company had been producing coal that would have given, if all screened, about 40 per cent of screenings.

LEADERS OF AMERICAN MINING CONGRESS FOR 1924

J. F. Callbreath, left, is the veteran secretary, re-elected at the Milwaukee convention to continue his service. H. W. Seaman, right, whose home is in Clinton, Iowa, but whose business interests are everywhere, centering especially at Deadwood, S. D., in the Trojan Mining Co., a successful gold enterprise, was chosen to succeed Sidney J. Jennings, of New York, as president of the Congress. During recent discussions about the possibility of choosing a "dictator" for the coal industry, a thing similar to the "dictatorship" of Judge Landis over baseball, Mr. Seaman was mentioned as a likely man for the big job.

A. J. Moorshead, president of the Madison Coal Corporation, said that the question of the proper use of

powder was most important both as concerning profit from the enterprise and conservation of life. At his mines a supervisor of explosives has been appointed. He sees that no wires are installed in magazines and no open lights are allowed to enter, only storage-battery lamps being permitted in such places, that sparkproof powder cars are employed for the transference of powder, that the cars are loaded at points where no circuits could ignite and explode the powder, that powder cars are properly closed when powder is being transported, that the electricity is not only switched off at two switches but locked off also with two keys, each held by a different official.

Shift bosses are employed to see that the drillholes are properly placed, and if not to give advice. Conditions are not getting better, however, but rather worse. Time was when $2.25 a ton was paid for the loading of pyrite and much of it was loaded, but today with the higher wages paid no one cares to load pyrite. A big enough earning can be made without it. Everyone is in a hurry to load up enough to get a pay that will suffice for a day and then go home.

Importance of "Beating the Miner To It"

Mr. Moorshead spoke quite forcibly on the ability to deal with the miner as being even a larger element of success than technique. He said the trouble with most managers was that they let the miner form his conclusions without due consideration of all the facts of a proposition. When the miner had once made up his mind and passed his resolution in union meeting it took months of negotiation to change his attitude, whereas five minutes of protest prior to the meeting would be likely to have the desired effect. He advised the management to "beat the miner to his decisions" by foreseeing what the miner is going to do and putting in his word first. If the local has pronounced on the subject, months of parleying are likely to follow, as likely as not without result.

Joe Harris, a miner, brought to the congress by Mr. Adams, said that the miners were not altogether to blame. The powder frequently is badly graded, and the quickness of the shot and the force was hard to determine. Holes of too big a diameter frequently were drilled, and such holes were dangerous.

Adam Borton, another miner, complained also of the lack of uniformity in powder, making standardization difficult. He declared that no shotfirer should shoot a hole that is too deep or of too great a diameter. He said that when he made his rounds he found some of the holes only partly completed. How deep the men intended to make these holes he never knew. He could only tell them how deep they should be. With such holes there might well be trouble. Those that were completed could be measured and if found of right length could be charged and fired safely. James Creighton and other miners followed along similar lines.

At the Mine Transportation meeting, at which R. Dawson Hall acted as chairman, J. H. Edwards, electrical engineer, Elkhorn Piney Coal Mining Co., Huntington, W. Va., read a short discussion on the advantages of standardized track gages, especially having regard to the experience of his company. His written statement follows:

"The Elkhorn Piney Coal Mining Co., which has been operating six properties in southern West Virginia and eastern Kentucky, has found that the greatest obstacle encountered during its efforts toward standardization of equipment has been the difficulty introduced by the different track gages. All except one of the six operations were acquired as producing mines and among those taken over were to be found the following track gages: 36, 40, 42, 44 and 48 in.

"An effort was made to eliminate from each operation any type of equipment of which only one or a few units were in use, and yet for which it was necessary to carry a full line of repair parts. Four types of mine locomotives were eliminated, resulting in a reduction of $6,000 in the stock of locomotive repair parts normally kept on hand at the mines. Nine types of mining machines were discarded, resulting in a reduction of $11,000 in the stock of that class of repair parts. Most of the standardization was effected by transferring equipment from one operation to another, but certain items, in most cases those which had become partly obsolete, were disposed of by sale.

"The standardization of locomotives, mining machines and other mechanical and electrical equipment made possible a reduction of more than $45,000 in the stock of repair and spare parts carried. In addition to the above specific illustrations of gain by reductions in stock of spare parts kept on hand, it should be mentioned that still greater advantages of standardization were evident in a more economical operation of equipment owing to the fact that the machine operators, motormen, repairmen and foremen became much more proficient through the continual use or supervision of only one type of machine for each kind of job."

Mr. Edwards, on being asked, stated that the management had favored a 42-in. gage as standard. Frank Haas, consulting engineer, Consolidation Coal Co., Fairmont, W. Va., declared that they probably always would have more than one gage, as narrow gages were needed in mines having bad roof. However, the Consolidation Coal Co., which had inherited a 42-in. gage had at its new mines, switched over to 48 in. He said that with cars having a 42-in. gage the track should be ¾ in. wider where the curve is on a radius of 24½ ft, and the wheelbase is 36 in. As regards bottom-dump cars, he believed that they could hardly be constructed safely in excess of 1½ or 2 tons capacity.

Virtual Wheelbase Longer than Actual

Mr. Illsley, electrical engineer of the Bureau of Mines, said that the U. S. Bureau of Mines was making a careful study of the friction of mine cars in relation to track curvatures, wheel diameters, wheelbases and bearings. Mr. Hall called attention to the great length of the virtual wheelbase on curves due to the impingement of the flange on the rails and also referred to a statement by William Griffith, of Scranton, that the weight of the wheels had a greater effect in resisting traction than an equivalent weight in the body of the car. Mr. Hall said that Mr. Griffith had proved this to his own satisfaction and that figures on the resistance of railroad cars obtained by Mr. Griffith sustained him in that opinion. Mr. Griffith believed that the rolling parts of mine cars and railroad cars were being made too heavy.

On the question "When and Where to Use Gasoline, Trolley and Electric Storage-Battery Locomotives," J. H. Edwards advocated the more extended use of the combination locomotive, stating that when this was done and the trolley was extended as fast as new work was opened unusual grades could be negotiated satisfactorily by the storage-battery locomotive from one

end of the day to the other. Mr. Benedict stated that in discussing the grade on which storage-battery locomotives can be used the frequency with which such grades must be encountered must be considered. With many grades of 10 per cent the storage battery would soon be bereft of power.

When the subject "Roller Bearings vs. Plain Bearings" was broached W. L. Affelder, general manager, Hillman Coal & Coke Co., Pittsburgh, Pa., stated that though more care is needed to be taken of the wasteful use of power where generated at an isolated plant, operators were more prone to watch such waste when purchasing power. The purchase of power therefore had done much to make the introduction of roller bearings rapid. He stated that he fully believed that roller bearings justified their use by reason of the power saved.

Power Saving Not the Only Advantage

H. K. Porter, of the Hyatt Roller Bearing Co., declared that the roller bearing was not to be advocated solely as a power saver. It saved in keeping the cars on the track, in lessening replacements, in the lubrication of cars both as to labor and as to lubricant. If the roller bearing never saved a kilowatt of power it would be amply justified by its other qualities. Furthermore, with roller bearings on the locomotive and cars the tractive effort required of the storage-battery locomotive is so greatly reduced that a locomotive that would run only part of a day could have its service extended a full day and could work at more nearly its full capacity the day long—an important consideration, making it possible to avoid boosting the batteries.

In the discussion on the "Advantages and Limitations of the Caterpillar-Mounted Shovel" J. F. Joy, of the Joy Machine Co., said that unless a machine had a long reach or the track was set in the center of the room the caterpillar mounting was absolutely necessary. A machine having long reach was likely to tip and come off the track. Where the track is over 42 in. wide, wheels can be used. Under 42 in. the caterpillar truck was preferable. By leaving a thin layer of bottom coal the caterpillar could be made to work over even the softest of clays but that was rarely advisable. He said that with his machine, the load on the caterpillar per square inch did not exceed the weight which a man imposed per square inch on the soles of his shoes when standing. Only in exceptional places and under unusual conditions was the caterpillar likely to become bemired.

On Wednesday afternoon the forum opened with a discussion on "Underground Power Equipment and Transmission" with R. Dawson Hall as chairman, the particular subject discussed being as to the relative desirability of alternating current and direct current from the standpoint of efficiency and safety. The question was on its way to pretty general settlement when fortunately, or unfortunately according to the point of view, C. L. Harrod, of the Indiana Coal Operators' Association, came in and took up the cudgels for the use of alternating current for mining machines—the well-recognized point of view of the Middle West, the East holding pretty generally to the view that nothing is to be gained by mixing current. Before Mr. Harrod came in it was generally conceded that big pumps and pumps near a borehole to the surface could best be run by alternating current and that alternating current could be favorably used on the surface and for distribution to substations but on the whole the current below ground for all services should be direct current.

F. C. Pullen of the General Electric Co., wanted to know how 3,000-kw. pumps like those at Ishpeming, Mich., could be economically run without alternating current. It was pointed out that they lie near the shaft and if they did not, such installations of large units are, and must always be, a law to themselves. Where electric power was used for hauling, however, smaller gathering pumps could get their power from the direct current installed mainly for other purposes.

Low-Voltage Alternating Current Wasteful

J. H. Edwards said that where direct and alternating current were distributed at the same voltage the losses with direct current were less than with alternating, for there was no inductance. Alternating current was best fitted for use where voltages were high, but with such high voltages the current could not be used for general mine purposes till it had been stepped down or converted to direct current.

Another member present, in discussing the possibilities or rather the near impossibility of using alternating current for haulage underground, stated that with direct current speed control was the more easily obtained. Starting torque, however, could be best obtained with alternating current. In considering the availability of alternating current, the space which machinery to handle it would require must be borne in mind. It must be remembered that it is essentially uneconomical as the power factor can never be 100.

Here Mr. Harrod came in, declaring that with alternating current, mining machines and pumps could be run in idle time when the locomotives were not running without the necessity of running converting equipment. He also said that in the Middle West machines cut during the day and not during the night, as in the East. Thus the machines and the locomotives were drawing on the power at the same time and two series of wirings were therefore more justifiable.

In discussing "The Relation of Feeder Lines to the Return Current" J. H. Edwards said that the feeder lines should be tested by the short-circuit test. After the return has been made perfect there is no reason to provide a feeder equal to that which the return will carry. That would be a waste of money if the power demanded by the machines and locomotives could be supplied without exceeding the prescribed voltage drop.

Wherein Centrifugal Pumps Excel

In the session on "Pumps and Mine Drainage," also presided over by R. Dawson Hall, G. V. Woody, of the Allis-Chalmers Manufacturing Co., stationed at Wilkes-Barre, Pa., read a paper on the relative desirability of various kinds of pumps urging that centrifugal pumps handling 1,000 gallons per minute or more were more economical than plunger pumps of the same capacity because of lower first cost both for equipment and emplacement and because of lower repair costs. Centrifugal pumps though less efficient would be more economical. Furthermore they do not take such a large and expensive pump room as the plunger units and the amortization of, and interest on, that investment with reciprocating units is considerable. C. R. Smith, of the Layne Bowler Mine Pump Co., then described a deep-well pump for installation in a borehole.

All the sessions of the Open Forum on Thursday were under the chairmanship of J. C. Wilson, of the Ohio Brass Co. Dr. John H. Barr delivered an address on the

"History of Power Transmission" the outcome of careful investigation the world over into the early methods of transmitting power. These inquiries had been made by F. L. Morse and C. L. Saunders of the Morse Chain Co. The address was accompanied by several illustrations from wall paintings, book illustrations, sketches and even a stained-glass window.

J. H. Edwards desired to know what efficiency could be obtained with various kinds of drive. Mr. Wheeler said that with silent chains the efficiency lay between 97 and 99½ per cent and that with belt driving it was about 90 per cent when the belt was new and 10 to 15 per cent lower when the belt was old. He declared that a silent chain continued to give the same efficiency after a long period of use. These figures are for the chain and belt alone and not for the bearings, the resistance of the latter being an additional cause of power loss.

Mr. Day, of Falk Corporation, said that with best lubrication friction loss with herringbone gears was 0.25-0.5 per cent. With heavier lubrication the loss would be more, yet it might be advisable to provide such lubrication in actual practice. In the case of marine turbine gears the efficiency ran from 98.7 per cent down to 97.4 per cent. This included all losses both for the gears and the journals. The losses of power were approximately the same whatever the load; in consequence the proportion of losses fell as the ratio of load to full load increased.

Dr. Barr said that at Cornell it had been ascertained that with a silent-chain drive, the losses due to the friction of the chain and the journal friction were such as to give an efficiency of 98.7 per cent.

The Standardization Meeting held its fourth general session on Thursday under the chairmanship of Lucien Eaton, of the Cleveland-Cliffs Iron Co. W. A. Durgin, of the Division of Simplified Practice of the Department of Commerce, addressed the meeting, using lantern slides to illustrate his remarks. He said that the Committee on Waste of the Federated Engineering Societies had found that the industries investigated were only 49 per cent efficient. The engineers who made that report cut the inefficiency alleged from 51 to 40 per cent so as to be on the safe side. The Department of Commerce has decided that it will be safe in assuming that industry is at least 20 per cent inefficient.

With a production of $50,000,000,000 of commodities per annum the loss must be $10,000,000,000. Our tax bill is conceded to be crushing, but it totals only $8,000,000,000. It could readily be met by savings in industry.

Simplifying by Elimination of Types

Among the big losses is the great variety of articles made. Every manufacturer seems to pride himself on the variety of his line. He could just as well get out a few standard patterns and stick to these instead of evolving a new one every day.

What Mr. Hoover is trying to do is to hasten the process of standardization. He realizes that the word is not popular. No one wants to be standardized. The standardization movement has supplied the press with many striking subjects for jibes. Mr. Hoover proposes "simplificiation" instead of the older term. This word appears to be, and is, less scientific than standardization. Instead of inquiring definitely what is the best, he would immediately inquire what design sells best or at least is most sold and then make this the standard till inquiry experiment and discussion develop a better one. Mr. Durgin said that, for instance, the bowl seat for agricultural implements and tractors was made in a multitude of forms, with slits and holes of various kinds and of many different shapes. Of all of them, however, one was most generally used, and the work of scientifically selecting the best was a job requiring much research as to the relation of the seat to anatomy, ventilation, to the difficulty of shaping and to many other matters. These problems were all answered by taking the seat most commonly used and adopting it at least as a temporary standard.

Albert W. Whitney, chairman of the Engineering Standards Committee, spoke on the necessity for standardization and pointed out that many variations in vegetable and animal life had been rudely blotted out by the processes of nature. The number of our fingers, our toes, our eyes, our nostrils and our teeth is standardized by the rude hand of evolution. He said all standardization did was to hasten the action which when it acted by evolution, as it did in business as in nature, was cruel and crude. Our needs were clear and we might as well recognize them early and satisfy them rather than wait and suffer in consequence.

Charles A. Mitke, chairman of the metal-mining branch of the Division of Standardization, who is recovering from typhoid fever at Long Beach, Cal., was not present but Colonel Warren R. Roberts, of the coal-mining branch, detailed the advances of standardization in every department of activity in America.

Is the Fire Door a Menace?

At succeeding meetings of the conference several important reports were made and there was discussion in some of them. The most notable was on machine loaders, and this has been covered by *Coal Age* in the report of the main meeting. The matter of fire doors versus reversing fans was inadequately discussed but it was pointed out that most coal mines must be ventilated continuously or gas will accumulate. In a metal mine ventilation is not so necessary and may be suspended temporarily by the use of doors. In that case the use of fire doors shutting off a burning shaft would be helpful even with men in the mine, provided that a second shaft is available, which is not always true at metal mines. The dangers of doors was not considered, apparently because those present, except one or two, sided with Mr. Mitke in the belief that a fire door could be shut at any time and under any conditions without menace.

Coal Consumption by Utilities Heavy in August; Power Production Declines

Electric public-utility plants consumed 3,196,950 net tons of coal during August, according to a report just issued by the U. S. Geological Survey. This compares with 3,034,915 tons consumed during July, according to corrected returns.

Fuel oil consumed by public-utility plants in August totaled 1,233,584 barrels, compared with 1,174,562 barrels in July. The average daily production of electricity by public-utility power plants during August was 150,200,000 kw.-hr., which was a virtual return to the May and June rates, thus confirming the occurrence of the "July slump" for this year.

The average daily production of electricity for the first eight months of 1923 and the proportion produced by water power were as follows: January, 153,300,000 kw.-hr., 34 per cent; February, 154,400,000 kw.-hr., 33.9 per cent; March, 152,500,000 kw.-hr., 36.3 per cent; April, 149,100,000 kw.-hr., 39.9 per cent, and May, 150,100,000 kw.-hr., 41.3 per cent; June, 150,800,000 kw.-hr., 38.9 per cent; July, 146,400,000 kw.-hr., 36.6 per cent; August, 150,200,000 kw.-hr., 34.2 per cent.

Problems of Operating Men

Edited by James T. Beard

Prevention of Mine Explosions An Unsolved Problem

Recurring Disasters Makes Problem of Prevention Most Important — Continued Study of Conditions May Reveal Causes as Yet Unknown

AGAIN, the daily press is burdened with accounts of recent mine explosions and other disasters. Reading of the great number of lives sacrificed and children left fatherless and reflecting on the frequency of such disasters, we cannot refrain from being appalled and discouraged by reason of our seeming impotency in respect to their prevention.

The most recent disaster, which occurred in the Kemmerer mine, in Wyoming, and in which 99 miners lost their lives, makes us wonder if these terrible happenings will ever cease and, if so, what will bring about their cessation. In the face of all that has been done to prevent such occurrences, it is not strange that we are discouraged by their continued recurrence.

Today, as a means for the protection of the lives of mine workers, we have a Federal Bureau of Mines and State Mining Departments with their staffs of inspectors and a great army of certified mine foremen and firebosses. Notwithstanding this, the question is uppermost in our minds as to whether miners, today, have any greater assurance of safety than they had a decade ago. This is not intended as a reflection on the work of these organizations, but merely to emphasize the meagerness of our knowledge of conditions that prevail and underlie the work of mining coal.

Seemingly We Have Yet Much to Learn

Time after time writers in *Coal Age* have advanced practical suggestions in reference to reducing the number of explosions in mines. Safety rules have been formulated, but how far these are being followed by miners and mine officials it is impossible to say. All we know is that the danger is not removed and is as imminent today as at any period of the past.

The question comes home to all of us, Are there some things yet to be learned regarding the causes of explosions in mines? It it not so long ago that these were attributed exclusively to gas. Then, explosions occurred under conditions that made it plain that gas was not the sole cause. Evidence pointed to the presence of fine dust as being a factor responsible for the initiation and propagation of the destructive blast.

Investigation showed that some coal dust was inflammable to a greater degree than other dust and that the fineness of the dust was also a problem. It was discovered that, under favorable conditions, the presence of this fine dust was a menace to the safety of the mine and if subjected to a flame of sufficient intensity and volume there would result a disastrous explosion.

Just here, let me ask, if our investigations have stopped there? Besides gas and dust, are there no other causes or conditions that will make an explosion possible? In this connection, I can do no better than to quote from a former contribution I made to *Coal Age* in 1915, in discussing the question of "Preventing Mine Explosions." (Vol 8, p. 269.)

Possible Factors in Mine Explosions

At that time, I asked "How much do we know in regard to the effect of strong air currents and the greater or less amount of available oxygen in the mine air; and to what extent are these actual factors in the initiation of an explosion in a mine, as has often been suggested by (the late) John Verner, former mine inspector in Iowa? Again, do we thoroughly understand to what extent or in what way changes of temperature, barometric pressure and seismic disturbances create conditions favorable to explosions in the mine?"

Did we know and understand all the conditions and causes that initiate and propagate explosions in mines, we could then doubtless prescribe an effectual preventive. But, as long as conditions exist that are favorable to explosions and regarding which we know little or nothing, it will be difficult to reduce their number or safeguard our mines against such disasters.

That both gas and dust accumulated in mines will, under favorable conditions, be the means of producing a destructive explosion is well known today. We realize that these elements of themselves are harmless; but the danger lies in their coming in contact with a spark or flame of sufficient intensity to cause their ignition. Knowing this, we are forced to the conclusion that disasters in gassy and dusty mines can be eliminated, or at least reduced to a minimum by adequate ventilation and other preventive measures.

Greater Care Needed to Avoid Disaster

Precaution suggests safer methods of installing high-voltage electric wires in mines generating gas or dust. Such mines are not immune from danger when operated with open lights, however well they may be ventilated and safeguarded by efficient and vigilant mine officials. Sudden changes that are always possible, in roof conditions, may release a quantity of gas that would be extremely dangerous if the mine is not worked exclusively with safety lamps of an approved type.

In conclusion, let me say that, even if our knowledge of conditions and causes that invite explosions was complete and rules prescribed to make the mine safe, nothing would be accomplished unless the rules were strictly followed by every worker in the mine. The careless act of a single miner may cause the injury or death of many others, who become the innocent victims of his neglect or disregard for safety.

Forgetting that there are a large number of careless and indifferent men employed in mines, some of

whom think or care little about their own safety, I am inclined to think that we are too often ready to attach blame to mine officials when disasters occur. We must remember there are miners who are opposed to all rules and restrictions and who will violate them at the hazard of their own lives. No mine can be safe when such men are employed. The strict observance of rules by all employees is essential to safety and this is particularly true in mines generating gas and dust.

Dayton, Tenn. JOHN ROSE,
Former District Mine Inspector.

Ventilating by Compressed Air

Accident caused by attempt to remove gas with compressed air—System unreliable as a means of ventilation—Fan required for efficiency.

AFTER reading carefully the various letters relating to the attempt of a fireboss to remove a body of gas, by means of compressed air, which have appeared in recent issues of *Coal Age*, I concluded there was much uncertainty in regard to the actual occurrence and the movements of the fireboss, who with the unfortunate pumpman lost his life as a result. The writer of the last letter on this subject, however, S. K. Mottishaw, *Coal Age*, Aug. 23, p. 289, I notice takes exactly the same stand as that taken in a previous letter, by John Rose. (Vol. 23, p. 978).

As remarked by Mr. Rose, if we take his assumption to be correct, "It was not only a most careless, but a highly foolish act for an experienced fireboss." With that conclusion I am in hearty accord. The blast from the high pressure air line striking the lamp, whether the latter was sitting on the floor or was carried by the fireboss, was certainly sufficient to force the lamp flame through the gauze and ignite the gas surrounding the lamp.

This incident is only one of many others that reveal the careless acts of some firebosses who, in spite of their experience and knowledge, persist in taking chances and doing things that they know are not warranted by the conditions about them. It does not always happen, however, that the one to blame pays the forfeit by the loss of his own life, as in this case.

No Reliance on Air Line for Ventilation

Attention has already been draw to the fact that the use of compressed air for the purpose of removing a body of gas is dangerous and should never be attempted. Where a mine is equipped for using compressed air for driving drills and coal cutters it is often the case that too much dependence is placed on tapping the air line for the purpose of ventilation. While the air exhausted by the machines is an unquestioned benefit and improves the ventilation of the place, no dependence should be placed on that as a means of ventilation.

It is well known that there are too many things to interrupt the continuous flow of the air from the pipes. The engine at the powerhouse is often stopped and started many times, during a twenty-four hour run. Again, there are numerous valves at different points on the pipe line and these are opened and closed, from time to time, which makes the system unreliable as a means of ventilation.

In closing, let me emphasize the point I wish to make that the sole dependence for efficient ventilation of a mine should be placed on the continuous operation of a suitable fan. While I do not wish to imply that the use of safety lamps is not essential in mines generating gas, yet I consider that the operation of a good ventilating fan is even more important than the light question, in a gaseous mine. While I believe in the exclusive use of safety lamps in gas, my conviction is that the providing of good ventilation in all mines is of far greater importance. R. W. LIGHTBURN.

Gans, Pa.

Improvement of Mining Law

Enforcement of existing laws more needful than making new ones—Status of mine foremen and firebosses—Responsibility under the law.

PERMIT me to endorse the reference made by F. C. Cornet in his letter, *Coal Age*, Aug. 9, p. 218, regarding the need of enforcing our present mining laws in making our mines safer for work. Mr. Cornet remarks, "Certainly it is not right to ask our legislators to make new laws for us so long as we fail to give a fair trial to those now on the statute books."

He advises caution in respect to making changes in present laws and the framing of new ones, claiming that too many or too stringent laws would hamper the industry without increasing the safety of mining. With him I believe that it is more important to enforce the laws we now have than to enact new laws that would probably prove no more effective in attaining the purpose sought.

Point Needing Revision in Pennsylvania Law

In this respect I am speaking with reference to the Tennessee mining laws and the conditions that prevail in our own state. My knowledge of the mining laws in other states is not sufficient to permit me to judge regarding their need of revision, except it may be in a few particular instances that have come to my attention and which have a common bearing on the conditions of mining in all coal-producing states.

One such instance, which has been thoroughly discussed in the columns of *Coal Age*, illustrates the danger that may result from changing laws that have proved effectual in maintaining safe conditions in mines. I refer to that provision made in the Pennsylvania law that authorizes the mine operator to employ uncertified mine foremen and firebosses. It is not my intention to expand further on this point, however.

Federal Employment of Firebosses

Another question that was broadly discussed in *Coal Age*, not long since, had reference to the suggested employment of mine firebosses by the federal government, instead of by the operator or company whom they served. In this connection, let me say that, here in Tennessee, the duties of both mine foremen and firebosses are prescribed by the law, which holds them responsible for any negligence on their part although they are employed by the company operating the mine and not by the state.

Few will deny that the two most important and necessary qualifications of all firebosses are competency and honesty in respect to the performance of their duties. Possessing these qualifications, it goes without saying that they will make safe officials whether employed by a company or by the federal government. On the other hand, if a fireboss does not have these qualifications, he will prove an unsafe official and it matters not who employs him.

For my part, I have never been able to see how the

employment of firebosses, either by the state or the federal government, could make our mines safer than they are under the present system. One thing is certain, the scramble for state and federal appointments always involves the idea of patronage; and it is generally true that, the more incompetent an applicant for a position may be, the more he will rely on his political pull.

Since the man with the strongest pull is the one commonly chosen for the place, it is reasonable to conclude that the employment of firebosses by the state or federal government would mean the appointment of many incompetent men for this responsible position. In other words, the more incompetent and dishonest applicants would generally land the job and the lives of our miners would be endangered thereby.

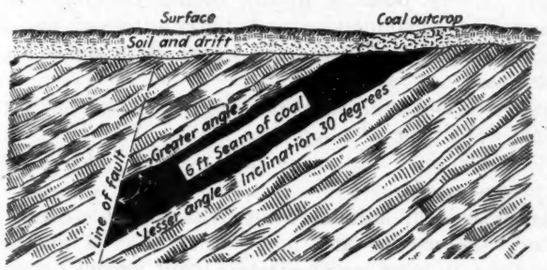
Dayton, Tenn. OBSERVER.

Downthrow or Upthrow, Which?

Hade of fault shows the fissure as having an inclination greater than that of the seam—Fault probably a downthrow—Follow the lesser angle in the seam.

KINDLY permit me to refer to the inquiry that appeared in *Coal Age*, Vol. 23, p. 608, in which the inquirer stated that all efforts to find the coal beyond the fault had proved unavailing. If the hade of the fault line is rightly shown in the illustration given in the reply to this inquiry, I would say that the fault is undoubtedly a downthrow.

By the "hade," I mean the angle that the fault line makes with the vertical. In this case, the fault line is shown as very steep and having an inclination greater than that of the seam. As stated in the reply made by the editor, I would follow the lesser angle in the seam, assuming the fault to be normal. As indicated in the accompanying figure, the lesser angle is at the floor and the fault, in my opinion, must be a downthrow.



SEAM FAULTED ON A STEEP INCLINATION

Some time ago, I remember, a writer, who discussed the question of finding the coal beyond a fault, stated that the deflection of the cleavage lines, in the seam at the fault, always pointed in the opposite direction from that in which the displacement had taken place. He said that if the deflection was upward the fault was a downthrow; and, *vice versa*, if downward, the fault would be an upthrow.

In spite of his claims that he has many times observed this to be the case, I want to say my experience is quite to the contrary, and I believe most mining men will agree that the bending downward or upward of the strata, in proximity to a fault, or any observed change in the inclination of the seam, is generally a fair index of the direction taken by the slip.

Linton, Ind. W. H. LUXTON.

Inquiries Of General Interest

Weight and Percent of Screenings, Pittsburgh Run-of-Mine Coal

Specific Gravity and Weight of Coal Varies —Average Weight of Prepared Run-of-Mine Coal — Estimated Percentage of Screenings

HAVING in mind making certain changes in our tipple arrangements at the mine, I am particularly desirous of obtaining reliable information on two points in respect to No. 8 Pittsburgh Run-of-Mine coal of a highly volatile character. First, what is the average weight of this class of coal per cubic yard? Second, what average percentage of screenings may be expected to pass through the screen when the rods are spaced one inch apart, which is the arrangement I plan to make, believing it will be of advantage?

The data I have been collecting, for some time past, shows considerable variation and makes me anxious to learn facts that will be more reliable. OPERATOR.

Akron, O.

At our request, A. F. Brosky, Pittsburgh editor of *Coal Age*, has given this matter close attention and sends the following information as being the most reliable:

The specific gravity of the coal forming the Pittsburgh seam, sometimes known as the "No. 8 seam," varies between the limits of 1.28 and 1.41. Taking the lower estimate, coal having a specific gravity of 1.28 will weigh, per cubic yard in the solid, $27(1.28 \times 62.5) = 2.160$ lb. Again, coal having a specific gravity of 1.41 will weigh, per cubic yard in the solid, $27(1.41 \times 62.5) = 2,380$ lb.

Observation and inquiry show that a fair average for this seam, in the Pittsburgh district and Ohio, may be taken as 1.31. This average specific gravity would make the weight of a cubic yard of the coal in the solid $27(1.31 \times 62.5) =$ say 2,210 lb.

Reports from various sources in the district show that the average weight of prepared run-of-mine coal (lump, nut and slack) of this class is about 1,300 lb. per cubic yard. We must bear in mind, however, that the particular character of the coal and the method of shooting, which vary in different localities where this seam is worked, will necessarily cause a considerable variation from this estimated average weight. Reliable figures, in any particular case, can only be reached by a careful consideration of both the hardness of the coal and the method of its extraction.

The foregoing remarks apply equally to the quantitative measure of screenings, in the handling of the coal in its preparation for the market. The character of the Pittsburgh seam and the hardness of the coal depend entirely on the location of the mine. Also, the manner in which the coal is mined will cause considerable variation in the relative proportions of lump, fine coal and slack.

A careful survey of the entire territory where this seam is mined justifies the statement that, under aver-

age conditions, from 35 to 40 per cent of the coal coming from the mine will pass through a 1-in. screen. Both the inclination and length of the screen bars, as well as the spacing of the bars apart, affect the percentage of screenings.

It is quite unusual to find the screen bars spaced one inch apart, the common custom being to use either ¾-in. or 1¼-in. spacing of the bars. Reports show that from 40 to 50 per cent of screenings pass through bars 1¼ in. apart; while from 25 to 35 per cent of screenings pass through bars ¾ in. apart. By interpolation, we estimate that bars 1 in. apart will produce from 35 to 40 per cent of screenings.

Examination Questions Answered

Examination, for Mine Foremen Olympia, Wash., Aug. 1, 1923

(Selected 1st-Class Questions)

QUESTION—*What are the regulations, in the state mine law, in regard to the inspection of a mine by the fireboss? What report is he required to make and what information should the report contain if gas is found?*

ANSWER—The state mining law of Washington (Sec. 33) requires the appointment of a fireboss, in every mine where inflammable gas has been found within a period of twelve months, or where spontaneous combustion occurs. The law further specifies that the fireboss so appointed shall inspect all working places within three hours of the time for commencing work, using for the purpose an approved safety lamp. The law also (Sec. 34) forbids workmen entering a mine where firebosses are employed, until the mine has been examined and reported safe for work.

Each fireboss (Sec. 115) must make a report of his examination on a bulletin board provided for that purpose at the entrance of the mine, indicating each place where gas is found and stating that all other places are clear of gas. This must be done before permitting the men to enter the mine. The fireboss must also immediately make a written report, in ink, in a book kept for that purpose in the mine office on the surface. His report must show the time of the inspection, the cause of any danger found and the steps taken for its removal. Where gas has been found, the report must state approximately the estimated amount. Every place where gas is found must be re-examined before men are permitted to enter for work. Removing gas by brushing, which is a common practice among many of the old miners, is forbidden by law.

QUESTION—*What are your views in regard to using mixed lights in a mine generating explosive gas?*

ANSWER—Where a mine is generating gas, in any section, in quantity requiring the use of safety lamps, no open lights should be used in any portion of the mine. In other words, the safest practice is to require the exclusive use of safety lamps or electric cap lamps. There is always danger in permitting the use of mixed lights in such mines.

QUESTION—*What does the mine law require in regard to electric locomotives operated by a trolley wire in a gaseous mine?*

ANSWER—The law (Sec. 155) forbids the use of electric locomotives operated by a trolley wire in any portion of a mine generating gas, except on the intake air.

QUESTION—*What is the maximum potential that can be used in a trolley system underground; and what does the law say in regard to trolley systems installed after passage of the law?*

ANSWER—The same section of the law (Sec. 155) limits the potential used in a trolley system underground, to medium voltage; provided, however, that all installations made after the passage of the Act and where the power is not taken from a station supplying power to a mine in operation previous to the Act, the potential is limited to low voltage.

QUESTION—*State the conditions under which mine explosions are most frequently produced. In what way do various kinds of coal dust influence the character of the explosion?*

ANSWER—Mine explosions are more common in mines generating considerable quantities of gas or dust and where adequate measures are not taken to prevent undue accumulations of these elements of danger. This includes all mines generating gas and deficient in ventilation; and all dusty mines where proper precautions are not taken to prevent the accumulation of fine dust and its suspension in the mine air. Strict rules and regulations must be enforced regulating the blasting of the coal, the kind of explosive used, amount of charge and manner of tamping and firing the shots to safeguard such mines against explosions.

The inflammability of the coal and the fineness of the dust are the chief factors that determine the danger and influence the character of the explosion, should one occur. Every possible means should be employed to prevent the accumulation and distribution of the dust and its suspension in the air where it becomes highly explosive.

QUESTION—*At mines that require the use of safety lamps, what type of lamp does the law require? What regulations does the mine law require where safety lamps are used?*

ANSWER—The mine law of Washington (Sec. 131) forbids the use of any lamp other than a magnetic-locked safety lamp, or an electric lamp, except by superintendents, shotlighters or other certified men, who may use such lamps as are approved by the mine inspector of the district.

The same section requires that all lamps used shall be the property of the owner of the mine. Every lamp must be examined by a competent person appointed for that purpose, immediately before the lamp is taken into the mine. No lamp may be used until so examined and found to be safe, clean and securely locked. The law forbids (Sec. 132) the use of open lights in any section of a mine requiring the use of safety lamps; and (Sec. 133) makes it a misdemeanor, punishable by a fine of not less than $50 or more than $200, or imprisonment for a term of not more than one year, if any unauthorized person is found opening or tampering with a safety lamp or having matches or other lighting device. The law provides, however, (Sec. 135) that an operator may appeal from the decision of a mine inspector to place a mine on safety lamps when he considers such order unreasonable, the appeal to be made to the mining board and their decision to be final.

Coal Commission Report on Labor Turnover In Bituminous Coal Fields Shows

Industry's Turnover as a Whole Not Unusually High Though Excessive in Some Districts

Labor Most Unstable in Non-Union Fields—Replacement Lower Among Machine Miners Than Among Pick Miners and Loaders—Movement of Outside Day Men Exceeds That of Inside Day Men

The study of Labor Turnover in the Bituminous Coal Mines of the Country for 1921 shows all varieties and extremes when looked at mine by mine and district by district. The study has shown percentages ranging from 7 per cent in a sizable mine in northern Ohio to 459 per cent for another in northeastern Kentucky. It has shown contracts for districts ranging from 30 per cent for Michigan to 224 per cent for the Kenova-Thacker region of West Virginia. For the country as a whole the degree of turnover for the industry does not appear to be greater than that which is accepted as the common experience of industries generally. The result for the 691 mines studied for the year 1921 are as follows: Total average on rolls, 122,048; all separations from rolls, 121,840; turnover percentage, 99.9.

As was pointed out in the report on turnover in the anthracite industry this does not differ greatly, and in fact is less than the experience of industrial concerns during 1913-14 and 1917-18. Brissenden and Frankel* in their study of turnover in some 160 varying concerns found an average for 1913-14 of 115 per cent. For 1917-18, a war-time year, the turnover average they found was 180 per cent. Their tables show that it was uniformly the experience for larger employers to have the lesser rate of turnover. For concerns employing under 1,000, which are more comparable in size to coal mines, the 1913-14 average for 29 concerns was 146 per cent and the 1917-18 average for 67 concerns, 221 per cent.

The anthracite report also gave the turnover percentages from a 1921 study of 11 industrial establishments in Philadelphia, made by the Industrial Research Department of the Wharton School of the University of Pennsylvania. The turnover percentages for these were as follows: 22, 36, 41, 59, 64, 110, 66, 140, 145 and 183.

The general experience of the bituminous industry in 1921 does not differ greatly from that of the anthracite industry during the same year. The median percentages for the three anthracite districts were as follows: Lehigh, 55; Schuylkill, 115; Wyoming, 100. The average for the three districts would not be far from the 1921 figures for the bituminous industry since Lehigh, though it has the least turnover, is much the smallest of the anthracite districts.

Turnover of Less Than 50 Per Cent Satisfactory

However, most progressive industrial establishments giving attention to the costs of labor turnover are not content with seeing a 100-per cent per annum figure. A certain amount of labor turnover undoubtedly is healthful to an organization, but it would seem that there is somewhere, though unestablished, a point of stability that lends to the greatest productiveness. Concerns maintaining a turnover percentage less than 50 per cent consider that a most satisfactory figure.

Table I shows the labor turnover in each of the 33 bituminous coal districts. This table and the accompanying diagram give a graphic picture of the variance in turnover percentages for districts. They show an astonishing contrast in the percentages for districts recognizably union and non-union. The non-union districts are uniformly much higher in turnover percentages than the unionized districts.

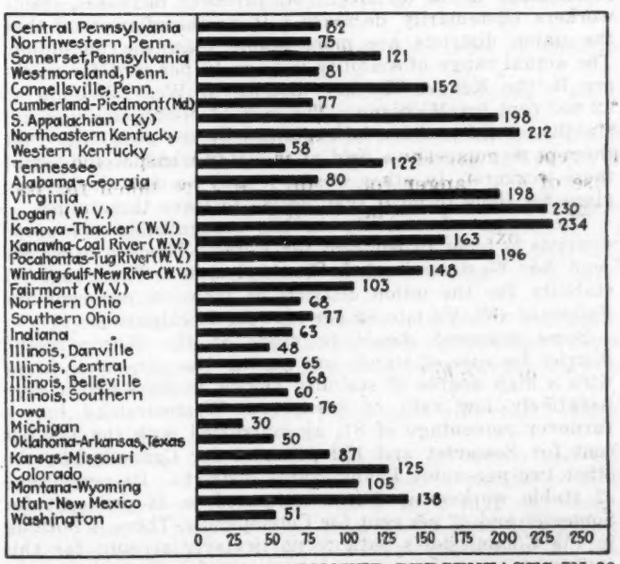
*"Labor Turnover in Industry," (MacMillan, 1922.)

For purposes of reference the following lists of the dominantly union, dominantly non-union and equally mixed or balanced districts are given. These were the conditions as of the year 1921, at least so far as the mine representation in the tables of this study show.

Non-Union	Mixed	Union
Somerset (Pa.)	New River-Winding	Central Pennsylvania
Westmoreland, (Pa.)	Gulf (W. Va.)	N. W. Pennsylvania
Connellsville (Pa.)	Tennessee	Panhandle-Fairmont (W. Va.)
Cumberland-Piedmont (Md.)		Kanawha-Coal River(W. Va.)
Logan (W. Va.)		Northern Ohio
Kenova-Thacker (W. Va.)		Southern Ohio
Pocahontas-Tug River (W. Va.)		Indiana
Virginia		Michigan
Northeastern Kentucky		Illinois—Danville
So. Appalachian (Ky.)		Illinois—Central
Alabama-Georgia		Illinois—Belleville
Utah-New Mexico		Illinois—Southern
Colorado		Western Kentucky
		Iowa
		Kansas, Missouri
		Oklahoma, Arkansas, Texas
		Montana, Wyoming
		Washington

The graphic contrast which the chart shows on the union and non-union districts is subject to a variety of explanation. It would appear on the face of it that the non-union districts undergo an alarming instability. The causes probably are many. In the first place it seems reasonable to presume that unionized districts lend security of jobs to miners. That is, discharge is most uncommon in unionized mines, because of involved union protection.

The opinion of some non-union operators is that the men move quickly if work becomes slack and there is the faintest rumor of work elsewhere. The shifting rates of pay, from mine to mine, probably induce some of this movement among workers, seeking the best rate or the best working advantages. In any event, such high rates of turnover as exist in some of the non-union districts are certainly unhealthful from a managerial point of view. If organiza-



COMPARISON OF LABOR TURNOVER PERCENTAGES IN 33 BITUMINOUS COAL-MINING DISTRICTS IN 1921

TABLE I—COMPARISON OF SEPARATIONS, ACCESSIONS, AND STABLE WORK FORCE FOR 33 BITUMINOUS DISTRICTS IN 1921

	District	No. of Mines	Average No. on the Roll	All Separations No.	All Separations Per Cent	Total Accessions No.	Total Accessions Per Cent	Stable Force No.	Stable Force Per Cent
1	Central Pennsylvania	50	11,431	9,408	82	10,808	95	6,638	58
5	Northwestern Penna.	40	8,612	6,429	75	8,503	99	4,784	56
2	Somerset (Pa.)	23	3,086	3,750	121	3,883	126	1,480	48
3	Westmoreland (Pa.)	36	6,436	5,246	81	6,044	94	3,858	60
4	Connellsville (Pa.)	23	4,097	6,212	152	6,864	167	1,704	42
6	Cumberland-Piedmont (Md.)	28	2,974	2,303	77	2,601	87	1,683	57
15	So. Appalachian (Ky.)	9	1,108	2,196	198	2,428	219	367	33
14	Northeastern Ky.	32	3,891	8,263	212	7,372	189	1,439	37
26	Western Kentucky	13	2,381	1,383	58	1,817	76	1,232	51
16	Tennessee	13	2,556	3,130	122	2,844	111	1,298	51
17	Alabama-Georgia	17	5,051	4,051	80	3,958	78	3,011	60
13	Virginia	13	2,485	4,923	198	4,343	175	995	40
9	Logan (W. Va.)	10	1,286	2,953	230	3,227	251	315	25
10	Kenova-Thacker (W. Va.)	5	599	1,401	234	1,570	262	114	19
8	Kanawha-Coal River (W. Va.)	22	3,036	4,956	163	5,203	171	1,172	39
12	Pocahontas-Tug River (W. Va.)	12	2,434	4,770	196	4,875	200	786	32
11	Winding-Gulf-New River (W. Va.)	10	1,814	2,684	148	2,813	155	840	46
7	Panhandle-Fairmont (W. Va.)	64	6,904	7,115	102	7,642	111	3,452	50
19	Northern Ohio	33	5,252	3,591	68	4,137	79	3,222	61
20	Southern Ohio	12	1,711	1,320	77	1,648	96	993	58
21	Indiana	33	7,602	4,768	63	5,874	77	4,552	60
22	Illinois—Danville	11	3,394	1,611	48	1,945	57	2,336	69
23	Illinois—Central	9	3,105	2,002	65	2,263	73	2,003	65
24	Illinois—Belleville	12	3,558	2,428	68	2,906	82	2,266	64
25	Illinois—Southern	14	3,409	2,036	60	2,253	66	2,247	66
27	Iowa	31	5,614	4,279	76	4,498	80	3,232	58
18	Michigan	6	874	265	30	268	31	719	82
29	Oklahoma, Arkansas, Texas	12	1,665	826	50	1,036	62	1,098	66
14	Kansas-Missouri	28	2,378	2,072	87	1,769	74	1,361	57
32	Colorado	42	6,178	7,746	125	7,816	126	2,773	45
30	Montana-Wyoming	22	3,804	3,998	105	4,421	116	1,981	52
31	Utah-New Mexico	14	2,330	3,221	138	3,044	131	955	41
23	Washington	6	993	504	51	696	70	652	66

tion morale, familiarity with the establishment, and settled community make-up have any value, the waste is certainly high in such districts as Logan, where but 25 per cent of the mine work force is stable or steady throughout the year, and the turnover runs up to 230 per cent per annum.

The mixed union-non-union districts of Tennessee and New River-Winding Gulf (W. Va.) present a peculiar contrast to the extremes of the union and non-union districts. The turnover percentage in Tennessee is shown as 122, and that of New River-Winding Gulf, 148. One non-union district has a lesser percentage than Tennessee and four 'ess than New River-Winding Gulf. No union districts have higher percentages than these two. Within the districts, however, there do not appear to be any marked differences in the experience of non-union and union mines.

Comparison of the percentage of stable or steady workers in the various districts, of course, bears a definite relationship to the turnover. As turnover increases, stable workers customarily decrease. It is therefore true that the union districts are more stable than the non-union. The actual range of stability is from 19 per cent for workers in the Kenova-Thacker district in West Virginia to 82 per cent for Michigan. The case of Michigan's unusual stability could perhaps be explained by the possibility that there is no competitive field of industry which would tempt these workers. In other words, it may be that there is no place for them to go if they decide to leave these mines.

The range of stability in the recognizable non-union districts is from 19 per cent for Kenova-Thacker to 60 per cent for Westmoreland in Pennsylvania. The range of stability for the union districts is from 50 per cent for Fairmont (W. Va.) to 82 per cent for Michigan.

Some comment should be made on the Westmoreland district because it stands out among the non-union areas with a high degree of stability among workers and a comparatively low rate of turnover. Westmoreland has a turnover percentage of 81, as contrasted with the 121 per cent for Somerset and 152 per cent for Connellsville, the other two non-union Pennsylvania districts. Its percentage of stable workers is 60, as compared to 48 per cent for Somerset and 42 per cent for Connellsville. There is nothing in the Commission's data to particularly account for this contrast.

The study has shown some contrasts in the turnover among the occupational groups. For the 691 mines covered the percentages of turnover for the five occupational groups are as follows:

	Average No. on Rolls	Total Separations	Turnover Per Cent
Machine miners	5,171	3,916	75.7
Pick miners	30,807	29,763	96.6
Loaders	39,891	43,825	109.8
Inside day men	30,874	28,534	92.4
Outside day men	14,646	15,032	102.6

The lowness of the figure for the machine miners may be explained by the fact that this is preferred work and that earnings probably are better in this group. The loaders perhaps have the hardest task in mining, and this would explain in a degree the higher rate in this group. Some surprise may be occasioned by the fact that the turnover is greater among outside day men than among inside day men. It has been something of a popular belief that men preferred to work above ground. This 10 point difference is not explainable from data available. It is of interest to note that the median percentage of stability in the 33 districts is 59 for inside day men and 65 for outside day men.

Table II shows the turnover percentages on the occupational groups in each district. It bears out in a degree what is noted as particularly true of occupational groups in tables 1-66 [accompanying the report] for individual mines in districts, i.e., that where the turnover is high in one group, it is as a rule, uniformly high in the others.

TABLE II—PERCENTAGE COMPARISON OF LABOR TURNOVER BY OCCUPATIONAL GROUPS IN 33 BITUMINOUS DISTRICTS, 1921

District	Pick Miners	Machine Miners	Loaders	Inside Day Men	Outside Day Men
Central Pennsylvania	108	59	86	57	74
Northwestern Pennsylvania	78	52	87	54	61
Somerset (Pa.)	124	104	152	96	97
Westmoreland (Pa.)	80	49	105	61	78
Connellsville (Pa.)	168	152	201	111	137
Cumberland-Piedmont (Md.)	79	...	111	61	89
So. Appalachian (Ky.)	294	124	229	179	206
Northeastern Kentucky	280	97	226	203	199
Western Kentucky	101	35	52	68	56
Tennessee	116	163	176	67	116
Alabama-Georgia	75	51	76	82	97
Virginia	157	122	198	177	279
Logan (W. Va.)	295	209	213	232	271
Kenova-Thacker (W. Va.)	300	270	220	249	221
Kanawha-Coal River (W. Va.)	140	86	190	156	136
Pocahontas-Tug River (W. Va.)	137	190	233	192	175
Winding Gulf-New River (W. Va.)	234	150	134	154	138
Fairmont (W. Va.)	108	98	116	86	98
Northern Ohio	33	46	73	65	64
Southern Ohio	...	48	90	62	49
Indiana	53	50	55	76	100
Illinois—Danville	64	36	33	41	44
Illinois—Central	68	35	61	76	49
Illinois—Belleville	68	48	69	82	40
Illinois—Southern	60	59	73	53	28
Iowa	79	92	76	71	76
Michigan	11	22	28	36	37
Oklahoma, Arkansas, Texas	51	94	62	38	49
Kansas-Missouri	97	40	98	64	66
Colorado	129	123	163	87	122
Montana-Wyoming	131	57	100	87	88
Utah-New Mexico	163	61	143	123	110
Washington	51	0	50	41	59

It should be understood that the tables and data presented herein have been subjected only to a limited analysis and interpretation to meet the broader purposes of the Commission. The study has shown chiefly these things:

(1) That the turnover for the industry as a whole is not remarkably high, as compared with other industries, although it is excessive in some districts.

(2) That for various reasons labor is much more unstable in non-union districts than union districts.

(3) That in mixed non-union and union districts the turnover percentage occupies a middle point between the extremes of the other two.

(4) That the turnover among machine miners is noticeably lower than that for the other two tonnage worker groups, pick miners and loaders.

(5) That the turnover is higher among outside day men than among inside day men, although the stability is greater in the first group.

Basis for Bituminous Study.—In undertaking the study of labor turnover in the coal industry, the desirability of making a current survey in the field was immediately considered. This would of course have permitted a checking

of the number of men having employment in mines and permitted some opportunities for ascertaining reasons for leaving and thereby the relative cause of turnover. But considering the extent of the industry and the vast number of mines, a field study was believed impracticable. The expense involved and the seeming absence of any administrative machinery in the mines themselves to do or assist in such work, put this out of consideration.

It was therefore determined that the study be made from that data which the Commission had available in the form of earnings reports on miners for the year 1921. This data consisted of schedules submitted by individual mines, showing by pay periods the earnings, days worked, etc., for each miner on a payroll during the year. It amounted to a draft of mine payroll for that year. The schedule used was known as Form L1. It possessed information sufficient to show separations from employment, complete separations or disappearances for the year, re-employments, and new hirings. It also, by a count of the full-year service men, furnished the number of the stable force, and likewise the number of men who were unstable. In addition it permitted a tabulation of the new men hired after the beginning of the year, and a tracing of the service of these men furnished the number of new hires who remained steadily at work until the end of the year.

Having these primary totals for computing turnover and its allied personnel data, the next question arising was what figure should be used as a basis for arriving at the turnover percentage.

Basis for Arriving at Turnover Percentages

The average number in attendance, a number obtained by taking the total man days worked and dividing it by the number mine days worked, was considered and a fairly accurate figure could be obtained for tonnage workers, i.e., pick miners, machine miners and loaders. But the outside and inside day workers had overtime lumped with regular time so that no accurate figure could be obtained. The reports showed many day workers as employed more days than the mine worked within a period.

It was finally decided that the average number on the roll for all pay periods worked would be employed. This figure was obtained by taking the total number of "man-pay" periods worked and dividing it by the number of pay periods the mine worked. This method took care of the men who worked a short time and gave full weight to the full-year workers.

The final question was the decision on what should constitute a "separation" or exit, the determining factor in computing the amount of turnover. Because of the irregularity of the industry and the fact that the schedules showed the movement of men largely in the time unit of the pay period it was decided that a disappearance of a man's name from the payroll (schedule) for one month (two consecutive pay periods) or more would constitute a separation. In addition this was a liberal interpretation likely to correct any errors of judgment on a lesser time allowance.

Thus, having defined the terms there were a few other questions which required answer. One was that regarding mines which worked only a part of the year. The conclusion here was that wherever a mine suspended operation for one or more pay periods (two weeks or longer) those idle periods would be disregarded. For example, employees who reappeared after a shutdown were considered as having been steadily employed. If they did not reappear they were counted as exits or separations. In this connection it was determined that mines operating less than 10 pay periods would not be considered in the tabulation. There was not a great amount of rejections on this account.

It was questionable whether the turnover might not be seriously affected in those mines where frequent suspensions or shutdowns occurred, or where few pay periods were worked. As the study developed it was found that with the two-pay-period separation as a basis for turnover little or no difference was noted between mines in one district working many pay periods and those in another working but few.

The actual tabulation became fairly simple after a code of checks was perfected and clerks' errors were detected easily, owing to the form of the tabulation record. For example, there could not be more unstable men than separations, or more "new men hired on the roll Dec. 31" than there were total "new men hired." The re-employments added to the complete separations or disappearances gave the total number of separations or exits, etc.

It is the prevalent custom both in bituminous and anthracite mines to pay miners semi-monthly. Here and there occasional mines pay monthly and some pay bi-weekly as differentiated from the semi-monthly practice. But these differences did not prevent uniform interpretation of "separations."

The method of districting the bituminous coal areas was arrived at by taking a simple consolidation of a geologic and trade districting developed by the U. S. Geological Survey. It is felt that the districts are easily identifiable for the purposes of this report.

It was the original desire to secure at least a 50 per cent representation of the mines in each district. This was possible for some districts, but for others, which were uniformly late in submitting their schedules to the commission, this delay and the pressure of time prevented a greater representation. This means that in some sections in West Virginia, such as Logan and Kenova-Thacker, and the eastern section of Kentucky a more adequate representation is to be desired. Actually the study has covered approximately one-fourth of the first-rate mines in the bituminous industry.

This study was made possible in its extensiveness through the use of data which Miss Anne Bezanson collected primarily for the purpose of the study of earnings, which lent itself to the needs of a turnover study, which has been made by Delos Walker. The plan and method of the turnover study was mainly due to the interest and attention which Dr. J. H. Willits and Miss Bezanson gave to it at its inception and during the course of is development. The actual work of tabulation and compilation was immediately in charge of Miss Elizabeth B. Lundy.

Brydon Committee Reaffirms Labor Policy; Recommends Advisory Board to Wadleigh

In recognition of the valuable services rendered the coal industry by the Bituminous Operators' Special Committee, its entire personnel has been included in a sub-committee of what has been the policy committee of the National Coal Association. The policy committee, however, will drop that name and will assume that of the Bituminous Operators' Special Committee. In this reorganized form, the committee, at its meeting held Oct. 9 in New York, adopted a resolution which reads as follows:

"Resolved, that this committee fully endorses and reaffirms the principles laid down by the Bituminous Operators' Special Committee in its statement on labor relations made to the U. S. Coal Commission under date of Nov. 10, 1922. The members of this committee believe such difficulties as exist in the coal industry to be due primarily to the following elements:

"(1) The monopolistic control of mine labor by absentee union officials.

"(2) Nation-wide as well as local strikes brought about by an irresponsible and autocratic organization.

"(3) Appeals by agitators and propaganda designed to breed dissatisfaction and create unrest among the people at large.

"We believe further that the following basic principles cannot be ignored:

"That every man has a right to work without interference or compulsion; when, for whom and upon such terms as he may see fit.

"That, while the right of workers to organize for legitimate purposes cannot be denied, such organizations have no right to impede or restrain those who do not care to join or to deal with them.

"That the right of private property is, and must remain, inviolable.

"That, in the last resolve, the law of supply and demand always will determine prices; that no legislation long can interefere with this inexorable rule; that any interference can be justified only, if at all, in time of war and that at any other time such interference inevitably will produce greater evils than those which it seeks to suppress.

"Be it further resolved that the National Coal Association, and its officers as such, refrain from taking any part, directly or indirectly, in the negotiation of a wage scale, in general or by districts, in any of the union or non-union bituminous-coal fields of the United States.

"Resolved, further, that all the data and statistics now in the possession of the National Coal Association, as a result of the work of the Bituminous Operators' Special Committee, compiled and in process of compilation, shall be placed at the disposal of every bituminous operator or group of bituminous operators in the United States, except information furnished with the understanding that it is to be held confidential."

Before the foregoing action was taken, J. C. Brydon addressed the committee. Among other things, he said:

"My experience as chairman of the Bituminous Operators' Special Committee naturally and necessarily placed me in touch with many coal operators. I found some who thought the National Coal Association could not continue to function without definitely recognizing the major problem of the industry, the problem of labor. Their minds were not clear as to how the problem should be taken up or as to the action which should be taken with respect to it. There was no crystallized thought on the subject. On the other hand, there are operators who feel that the National Coal Association should have nothing to do with labor matters.

"In my opinion, labor is the major problem, but there are legislative problems and many other important matters with which to deal. It was to meet such a situation that this committee was created to secure the common judgment of the industry. Its membership includes operators within and without the National Coal Association. Its membership is divided evenly as between so-called union and non-union operators. Its members are so located geographically as to be representative of the country's production.

"This committee will not, and cannot, usurp the functions of the board of directors of the National Coal Association. I am sure I bespeak the thought of the membership of that association when I say that this committee can be very helpful. There will be times when matters of policy that affect the entire industry must be considered. At other times, only sections of the industry will be affected, but in either event the counsel and advice of this committee will be representative of the entire industry.

"It was helpful many times that the Bituminous Operators' Special Committee had a broader sphere of action than did the National Coal Association. I can foresee that such may be the case with the new committee.

"The Special Committee leaves a legacy of information and statistics gathered from every bituminous field in the country. Never before was such an array of facts and figures available to those who must make the industry's case. This information in the form of final compilations which are being made will be available to any operator or group of operators, excepting of course the confidential information which was entrusted to the committee."

A committee composed of the presidents of the National Coal Association, the American Wholesale Coal Association and the National Retail Coal Dealers' Association was recommended to F. R. Wadleigh by the Bituminous Operators' Special Committee in response to his request for a suggestion as to what sort of advisory committee should be created to co-operate with the Department of Commerce on coal matters.

JOHN L. LEWIS, president of the United Mine Workers of America, has accepted the presidency of a co-operative labor bank which will open in Indianapolis about Jan. 1, with a capitalization of almost $1,000,000. Election of officers of the bank, to be known as the United Labor Bank & Trust Co., is to take place at the end of this month. A number of other unions, as well as that of the miners, are participating in the formation of the bank, it is announced.

THE U. S. SUPREME COURT on Oct. 10 issued a rule upon the Corona Coal Co. to show cause why the appeal in its case against the United States should not be dismissed. The case involves the basis of settlement for coal requisitioned by the Railroad Administration.

Iron and Steel Electrical Engineers' Meeting And Exhibition Well Attended

The annual convention of the Association of Iron and Steel Electrical Engineers at Buffalo, N. Y., Sept. 24-28, was the most successful in the history of the organization. This year the convention was held jointly with an exposition by more than a hundred manufacturers of electrical and mechanical machinery. Much of this equipment covered electric transmission, power drives, material handling and transporting machinery, pumping, control apparatus, power-plant accessories, together with steel-mill production apparatus. Many of these exhibits included operation and demonstration of the equipment.

The attendance, as reported by the association secretary, John F. Kelly, showed about 1,200 members present, a large proportion of the membership, which includes many coal-mining men who found both the exhibit and convention of great interest and value.

At the first day's session Walter C. Kennedy made an interesting survey of the rapid increase in the application of electric equipment. The saving in cost of attendance, maintenance and repairs in many instances has done much to further the application of electric equipment in the steel mill as also in coal mining.

The discussion on the work of the special bearing committee showed that there is an increasing desire on the part of those who have used ball- and roller-bearing motors to work out their problems with the manufacturers with a view toward standardizing on a range of fifteen different sizes of bearings for motors up to 100 hp.

The paper on "Motor Operated Centrifugal Pumps" brought out considerable discussion on the subject of overloading the motor when the pump operates at heads less than that for which the pump was originally intended. By using a 40-deg. rated motor it was shown that damage to the motor was more remote at low heads than when the pump was driven by a 50-deg. rated motor.

In the paper on "Economical Use of Fuel" H. C. Siebert gave examples showing that the average boiler plant operated at an efficiency of 50 per cent whereas it should be 80 per cent by the use of more efficient boilers and regulation and control of the fuel used.

The paper on "Tempering of Coal," by Thomas A. Marsh, gave results obtained by moistening coal before burning. The advantages claimed were: Less holes in the fire bed, higher combustion rates, less ash and less excess air. Interesting conclusions gathered from questionnaires, however, showed that although moistening coal is in general desirable it should be done only after careful study, as too much moisture or moisture added in stoker hoppers does not bring about the desired results.

"High-Pressure Steam Boilers" was the title of a paper by Dr. D. S. Jacobus, in which he showed how the superheating of steam was controlled by placing the reheater above the upper deck of boiler tubes and provided with a damper.

Thursday evening a banquet and dance was held at the new Hotel Statler. After the banquet announcement was made of the following officers for the coming year: President, R. S. Shoemaker, superintendent of maintenance, American Rolling Mills Co., Middletown, Ohio; Secretary, John F. Kelley, Pittsburgh, Pa.; Treasurer, James Farrington, Steubenville, Ohio.

Owing to the broadening of the field of the society, a suggestion has been made to change the name of the society to Iron and Steel Engineers. Action on this question will no doubt be given consideration at future meetings of the society and its branches.

THE INTERSTATE COMMERCE COMMISSION will continue its investigation of anthracite rates at hearings at Augusta, Me., Oct. 29; Montpelier, Vt., Oct. 31; Boston, Nov. 2; Albany, Nov. 5; Rochester, Nov. 7; New York City Nov. 9, and Philadelphia, Nov. 13. The commission's inquiry has been undertaken at the recommendation of the U. S. Coal Commission. A preliminary hearing was held last month at Pittsburgh.

Sees Non-Union Producers in Commanding Position as Result of Rigid Wage Agreement in Union Fields

Closing of Lake Season on Heels of Resumption of Anthracite Mining Expected to Be Depressing Factors to Organized Mines—Union Operators Unlikely to Be Able to Grant Increase or Fight Union

By Paul Wooton
Washington Correspondent of *Coal Age*

Never before in the history of coal mining in America have the non-union coal operators been in as strong position as they are today. Even with the large number of non-union mines that have been opened during and since the war period, the depression which is slowly and surely settling around the coal business is bringing no gloom to the non-union territory. The operators there are buoyant because the next six months promise to be a succession of great field days for them. The union fields are tied, hand and foot, with an inflexible wage agreement. The Lake movement will be over soon, robbing portions of the union territory of much of the vitality that it still possesses. It now is apparent that the demand for bituminous coal to take care of the requirements of those who are unable to get anthracite will be small indeed. In fact the saturation point in anthracite will have been reached before many weeks have passed. Bituminous coal stocks are heavy—ten million tons more than those on hand during the corresponding period before the 1922 strike.

In the face of a situation such as they now are facing, the union operators have reason to feel gloomy. By the end of this coal year they will be in no position to grant an increase of wages. Neither will they be in a position to fight the United Mine Workers. They will be, more or less, at the mercy of that organization unless Congress should threaten some drastic action which would be indicative of crystallization of public sentiment against the forcing of the wage for one craft to the point where it loses all semblance of proportion with the wage paid in other industries for comparable service.

Strikes Act as Dope to Union Mines

Were the United Mine Workers willing to leave the whole matter in the capable hands of John L. Lewis, it is probable that he would give prompt assurance that no increase in wage would be asked for the workers in union bituminous mines. He knows that nothing would work more discomfiture to the non-union operators. He knows that if he takes full advantage of the weakness of the operators in the union fields and exacts the last shekel he can wring from them, it simply will close down an additional large number of union mines and throw another big block of tonnage into the lap of the non-union operators.

The growing schism between union and non-union operators is becoming more and more apparent. It is the outstanding weakness of the bituminous-coal industry. The operators were quite right in their New York meeting last week in reaffirming their statement that shortages and high prices of coal hark back to strikes, but it was these very strikes which brought prosperity to the non-union fields and put them in their present commanding position. These strikes have been as dope to the union operations. Following a strike, they have a period of hectic activity, but as the effect of the narcotic, in each recurring instance, wears off, the industry becomes more and more devitalized and unstrung. This is having its effect on the United Mine Workers. If the radicals and the one-eyed among them insist on pushing costs to a new high level, there are not going to be many mines left to check off.

The operators are correct in saying that the Harding Coal Commission emerged from its studies without recommending any national labor policy. We are no nearer an answer to the question as to whether or not we are to continue to have nation-wide strikes. It is significant, however, that the Bituminous Operators' Special Committee, in its old form or in its new form, has been just as inconclusive as was the Coal Commission. Its members can agree upon a denunciation in round terms of the monopolistic United Mine Workers, but they have no plan that promises any relief from present conditions. They can get together and affirm certain general principles, such as the right to work, the right to organize for peaceful purposes or to declare that private property should be inviolate, but their criticism of the civil liberties report applies with equal force to their own accomplishments. They can agree on a statement of abstract rights, but they cannot apply them.

The clash of interest between union and non-union operators is just as real, just as clear as it was in 1922. Apparently the application of any constructive principle must await the time when the non-union operators will pledge themselves jointly to maintain some reasonable, proper and constant relationship between their wage rates and those in effect in the union fields. If the non-union operators were to visit England and visualize the working of the district autonomy wage rate, they might see some advantages for the nation and even for themselves in the stabilization of rates.

I. C. C. Grants Rehearing in Assigned-Car Case; Change in Decision Unlikely

While the Interstate Commerce Commission has bowed to the large number of requests for a rehearing in the assigned-car case, there is no reason to think that the Commission will change its opinion as to the preferential use of cars for railroad fuel. The rehearing will be before Commissioner Aitchison at Washington, Oct. 22. The only hope of the protestants apparently is that some amendment may be worked out which will mitigate somewhat the blow to those owning private cars. There is a powerful influence behind the movement, in that this action is certain to be the forerunner of restrictions on private cars used for the transportation of commodities other than coal.

All admit that the decision has precipitated a serious situation for the owners of private coal cars. The number of coal cars privately owned is not less than 30,000, representing an investment of $75,000,000. If the order of the Commission becomes effective, the owners of this property will have only one buyer. The cars will have to be sold to the railroads and they will take them at their own price, it is argued. In the case of some producers of coal, their investment in cars is greater than their investment in mines.

In certain instances, perhaps in many, prospective purchasers of private cars wrote to the Commission asking if there were any thought of abolishing their use. On assurances of the country, millions of dollars are thought to have been invested. It is known that this phase of the question will be emphasized at the rehearing.

The Commission's opinion, as it now stands, will result in great advantage to certain large coal-mining interests, it will be argued. Where the mines of a powerful company are served by a short railroad line, it will be possible for that railroad to purchase a large supply of cars which would assure those mines a full car supply. An instance is the recent sale of the Sandy Valley & Elkhorn R.R. by the Baltimore & Ohio to the Consolidation Coal Co., which owns

most of the mines on the line. This railroad already has a large ownership of cars. If the decision stands, there will be many cases in which branch lines will be sold in such a manner.

The private-car owners will argue that the Commission should not go further than denying them preferential use of railroad facilities for their cars. The validity of an order which goes beyond what is necessary to eliminate an actual discrimination will be questioned.

The long and respectable history of private cars will be reviewed. When the charter was granted to the Pennsylvania Company, the railroad was regarded as a public highway on which the user was expected to furnish his own vehicle for the handling of his freight. It will be pointed out that private cars have had a great effect on stabilizing the coal market and have been a great public safeguard, especially in their use by public-utility companies.

The attitude of those who favored abolition of the assigned-car practice toward the rehearing granted by the Interstate Commerce Commission is one of waiting for developments. A conference was held Oct. 15 by officials of the National Coal Association, which had advocated abolition of assigned cars for railroad fuel and which maintained a neutral attitude toward privately-owned cars, and arrangements were made for representation at the hearing. Inasmuch as the Coal Association is a party to the proceedings, traffic officials of that organization declined to comment upon the action of the Commission in reopening the case.

It was pointed out by some of those who had viewed with satisfaction the order of the Commission last spring doing away with the assigned-car rule that inasmuch as the Commission had this case before it about two years and took testimony and evidence for more than 30 days, the granting of only twelve days' time between the order for rehearing and the date of that rehearing indicates that the Commission expects argument and not further evidence to be developed.

Within the twelve days, it was declared, it would be practically impossible to obtain new evidence bearing on the case, even if all the evidence had not been exhausted previously. Supporters of the original decision assert that the move at the rehearing is up to the petitioners, and that those favoring retention and execution of the order will be present to meet whatever develops from these petitioners.

The decision of the Commission in the assigned car case was by a 7 to 4 vote. Unofficially, it is understood that the case was reopened by a vote of 6 to 5.

Proponents of abolition of the assigned-car practice point out that the United States Coal Commission, in its report, condemned this practice, although suggesting the advisability of some system of assuring transportation to those contracting for large coal supplies.

Dean Cooley Announces Resignation

Mortimer E. Cooley, dean of the College of Engineering and Architecture of the University of Michigan, announced his resignation as president of the American Engineering Council of the Federated American Engineering Societies at the opening session of a two-day meeting of the Executive Board of the Council held in Rochester, N. Y., Oct. 12.

In presenting his resignation to the Board, Dean Cooley said that he retires on account of ill-health. He also made it known that he has been granted leave of absence by the University of Michigan for the second half of the academic year of 1923-1924. Dean Cooley, who is now in his sixty-ninth year, succeeded Herbert Hoover as president of the Federated American Engineering Societies two years ago.

The Executive Board, it was announced, will call for nominations for the presidency of the Federation and Dean Cooley's successor will be formally chosen at the annual meeting of the American Engineering Council, executive organ of the Federation, to be held in Washington, D. C., early in January.

The Committee on Storage of Coal, W. L. Abbott, chairman, named by the Federated American Engineering Societies, appointed Dean F. L. Walker as field executive, who visited forty-four cities to obtain co-operation in the making of the report. Eighty-five subcommittees formed in as many cities or states are considering the problem and will make reports. Forty-eight have done so already. The number of engineers serving on the main and subcommittees is 388. To date $10,450 has been paid in or promised to finance the inquiry. The report should be ready about the middle of January.

Leland Coal Co. Expands in Illinois, Kentucky and Indiana

A reorganization and expansion of the Leland Coal Co., of Chicago, sets that concern up as an important operator of Illinois, western Kentucky and possibly Indiana. The company leases the six mines of the associated Union Fuel Co. in the Springfield (Ill.) district, and is now operating them. Also the Leland company is opening up an acreage it has purchased from the Verona Coal Co. at Verona, in Grundy County, Ill. There it will operate in the northern Illinois longwall region the only room and pillar mine on the Santa Fe R.R. The coal is under about 100 ft. of cover and varies in thickness from 5 to 10 ft. The mine may be developed to an output capacity of 2,500 tons a day.

At Waverly, Ky., 50 miles southwest of Evansville, Ind., the company has taken over the old Waverly mine in Union County, on the Illinois Central R.R. This mine, which has stood idle for several years but which is considered to be in excellent condition, will be rehabilitated at once by the Allen & Garcia Co., engineers, of Chicago, and put into operation. The company also is negotiating for the purchase of certain Indiana mines. The officers of the company are W. H. Leland, president; John D. Harris, secretary, and B. F. Bliss, treasurer.

Illinois Miners' Union Did Not Sell Herrin Strip Mine After All

It is authoritatively reported that the recently announced "sale" of the Lester strip mine, scene of the Herrin massacre of 1922, was no sale at all. The United Mine Workers of Illinois continue as owners of the property, having created the Mammoth Coal Co. with C. C. Shive as president, merely as an operating concern. The plant is now loading coal as fast as a dragging market will absorb it. The property was taken over by the Illinois branch of the miners' union in order to quiet large damage claims of the Southern Illinois Coal Co. against the union following the destruction of the plant and the slaughter of twenty-two non-union workers by an attacking mob.

PRESIDENT COOLIDGE HAS COMMENDED F. R. WADLEIGH for the service he rendered as Federal Fuel Distributor. In a letter to Mr. Wadleigh the President says: "I have received your final report as Federal Fuel Distributor under the provisions of the act of Sept. 22, 1922, your office having expired by limitation on Sept. 22, 1923. I have noticed the report with interest and am glad to have this résumé of the work concerning the distribution of coal during the past year. As I have had some occasion during the last few weeks to know of your work in this connection I want to take this opportunity to express to you my very cordial thanks for the able and efficient manner in which you have conducted the affairs of your office and your willingness to be helpful at all times. I want to assure you of my high appreciation of your services and express best wishes to you in whatever line of work you may take up in the future."

THE U. S. SUPREME COURT has allowed the motion of the government to advance argument in the appeal of the Federal Trade Commission against the decision of the Court of Appeals of the District of Columbia in the case of the Claire Furnace Co. The lower court ruled against the authority of the Commission to require basic industries, such as coal and steel, to furnish cost data reports. The case has been assigned for argument Dec. 3.

Coal Probes On in New York

Richard A. Enright, Police Commissioner of New York City, on Oct. 9 directed police commanders in every precinct to make a complete survey of the coal situation. The purpose is to assist the recent campaign undertaken by the Department of Public Markets to stop profiteering in coal and to co-operate with the state in case of another coal shortage.

The police were directed to ascertain from coal dealers the amount and sizes of the coal now in stock, the price per ton and the approximate amount they will obtain monthly. If in certain sections it is found that fuel is readily obtainable while in other districts with the same class of residents a scarcity is apparent, the reason for this will be brought to light and steps taken to remedy the situation.

Complaints from different parts of the city of inability to obtain coal since the settlement of the coal strike having reached the Federal District Attorney's office, Colonel William Hayward, U. S. Attorney, also has announced an investigation to discover whether he can obtain enough evidence to go before the Grand Jury and ask indictments.

Southwest Operators See Traffic Victory

An important traffic victory for the Southwestern Interstate Coal Operators' Association is foreshadowed in the recommendation made to the Interstate Commerce Commission by its examiner in the case of the association against the Arkansas Western Railway Co. The examiner recommends certain lower rates to the highly competitive consuming points of Kansas City, Omaha, St. Joseph and Leavenworth. He suggests that the Commission should find as follows:

"That the rates assailed on lump coal are and for the future will be unreasonable to the extent that they exceed or may exceed to Kansas City, Mo.-Kan., $1.35 from the Rich Hill group, $1.60 from the Pittsburg group, $2.75 from the Arkansas-Oklahoma group, and $1.35 from the Spadra group; to St. Joseph, Atchison and Leavenworth, $1.65 from the Rich Hill group, $3.05 from the Arkansas-Oklahoma group, and $3.45 from the Spadra group; to Omaha and points taking the same rates, $3.70 from the Arkansas-Oklahoma group and $4.05 from the Spadra group; and to Sioux City, $3.10 from the Rich Hill group, $3.35 from the Pittsburg group, $4.20 from the Arkansas-Oklahoma group, and $4.55 from the Sprada group.

"That the rates assailed on slack coal are used and for the future will be unreasonable to the extent that they exceed or may exceed to Kansas City, $1.10 from the Rich Hill group; to St. Joseph, Atchison and Leavenworth, $1.35 from the Rich Hill group and $2.75 from the Arkansas-Oklahoma and Spadra groups; to St. Joseph, $1.60 from the Pittsburg group; to Omaha and points taking the same rates, $3.35 from the Arkansas-Oklahoma and Spadra groups; and to Sioux City, $2.80 from the Rich Hill group and $3.85 from the Arkansas-Oklahoma and Spadra groups."

Gompers Again Heads Federation of Labor

Samuel Gompers was re-elected unanimously as president of the American Federation of Labor just before the adjournment of the forty-third annual convention, at Portland, Ore., Oct. 12. Addressing the convention just before its close, Mr. Gompers, who is 73 years old, declared that the gathering had given notice that a cleavage had been made between those loyal to organized labor and those who, boring from within, had sought to stab the labor movement in the back. "The results of this convention," he said, "will make for solidarity in the ranks of labor."

All the present officers of the Federation were re-elected.

In reviewing the convention's work Mr. Gompers referred to the expulsion of William F. Dunne, delegate from Butte, Mont. "This is a convention of organized labor," he said, "and any man who is hostile to labor has no right in this convention. I feel that the action taken has clarified the atmosphere. I think we have been entirely too lenient toward those who have been boring from within. Those men who meet at midnight in the forest, plotting not only against the government but against the labor movement can go ahead as they please, but they must do so outside the ranks of organized labor."

Commission Issues Report on Wage Rates In the Bituminous Coal Industry

The U. S. Coal Commission issued its report on Wage Rates in the Bituminous-Coal Industry, Oct. 17, the examination having been made by W. E. Fisher, of the Wharton School of Commerce and Finance of the University of Pennsylvania. This is one of several studies made under the general supervision of Dr. Willits and was co-ordinated with his investigation of the Causes of Strikes as well as on Miss Bezanson's study of Earnings. The report on wage rates comprises 54 typewritten pages with an appendix of 102 tables showing rates and changes in rates for specified occupations from 1912 to 1923.

Wadleigh, in Final Report, Says Nation Is Assured of Full Winter Coal Supply

In his final report to the President, made public Oct. 16, F. R. Wadleigh, Federal Fuel Distributor, says the country can feel assured of an adequate supply of coal during the coming winter. His office, which was created during the strike emergency of 1922, expired by limitation Sept. 22.

"The railways are successfully meeting to-day's unprecedented traffic demands, and it is expected that the transportation of coal and other fuels will be adequately handled during the coming winter season," says the report.

"Since there is no reason to anticipate any substantial interference with production of coal during the winter months the country may be reasonably assured of an uninterrupted supply of this commodity so necessary to its health, comfort and prosperity."

Coal shortage last winter, the Federal Distributor said, was largely nothing more than anthracite shortage. He said domestic consumers used substitutes with great reluctance and that other fuels were usually available.

Domestic consumers have not stored an unusual quantity of coal, but no difficulties during the coming winter are foreseen by Mr. Wadleigh.

Pinchot Consults Operators on Coal Prices

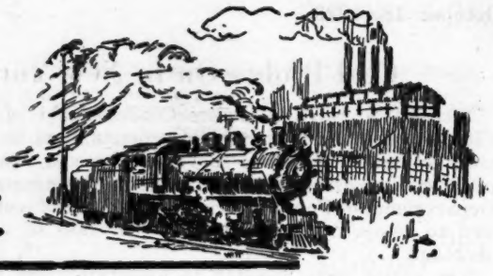
Governor Pinchot held a conference Oct. 15 at Harrisburg with S. D. Warriner, chairman of the Anthracite Operators' Policy Committee; W. J. Richards and A. B. Jessup and discussed with them "available methods of reducing the price of coal to the consumers to the level of last year." The conference was held at the invitation of the Governor.

The operators present were members of the producers' negotiating committee which met with the miners' union officials last month and agreed on the anthracite wage contract now in effect. W. W. Inglis, the fourth member of the committee, was not present. The result of the conference was not divulged but Governor Pinchot said that the operators would return for another conference next week.

IN A LETTER sent to President Coolidge Oct. 15, Governor Silzer of New Jersey urges that the coal situation be included in the subjects considered at the conference with state executives at the White House next Saturday. "The situation is one that can only be dealt with and solved by the national administration (with some aid from Pennsylvania)," wrote Governor Silzer. "Nevertheless, I am sure that the Governors will be glad to aid you by stimulating public sentiment in their respective states if you have an effective plan to relieve the people."

THE INTERSTATE COMMERCE COMMISSION has announced that hearings in the Virginian case, Finance Docket 2812, have been postponed until Oct. 31 at Washington before Examiner Charles D. Mahaffie.

Production and the Market



Weekly Review

Production of soft coal has been affected by the resumption of anthracite mining; demand is slower and prices show a further decline. The spot market is quiet, while deliveries of contract coals are being curtailed wherever possible. In the West warm weather has curtailed the demand for domestic coals, while in the East reserve stocks together with reduced industrial operations in various lines have affected the steam-coal situation.

For the sixth consecutive week *Coal Age* Index of spot prices of soft coal shows a decline. On Oct. 15 it registered 185, a drop of five points from the previous week, and of twenty points since Sept. 10. The average price of soft coal was $2.24 on Oct. 15, a drop of 6c. from the preceding week and of 25c. from Sept. 10.

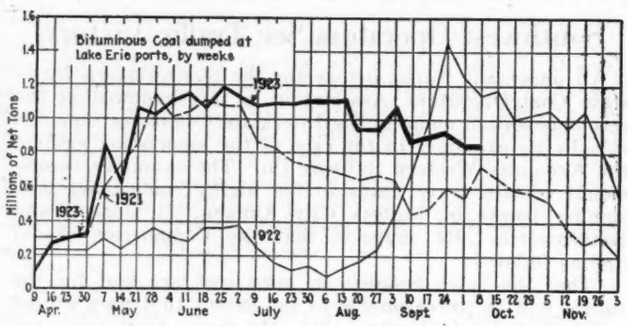
Output Drops; Rebound Looked For

Production of soft coal for the week ended Oct. 6 is estimated by the Geological Survey at 10,782,000 net tons, a decline of 565,000 tons when compared with the previous week's output, but it is expected that last week's production will show a partial recovery from this loss. Production of soft coal during the first 236 working days of this year was 424,257,000 net tons, which has only been exceeded once during the corresponding period of the past six years in 1918 when it was 454,515,000 tons.

Movement was slow in the Chicago market. "No bills" affected the Illinois mining operations, while the situation in western Kentucky is anything but satisfactory. Mine closings in Illinois and Indiana are growing in number.

Dullness prevails in the Ohio markets, with inquiries scarce. The Pittsburgh market is quiet and buyers are slow to show any interest in the situation. In New England the steam-coal market is in bad shape and trade is stagnant. Reports of further curtailment in the textile industry are current, either by a complete shutdown of some mills or a reduction in working time.

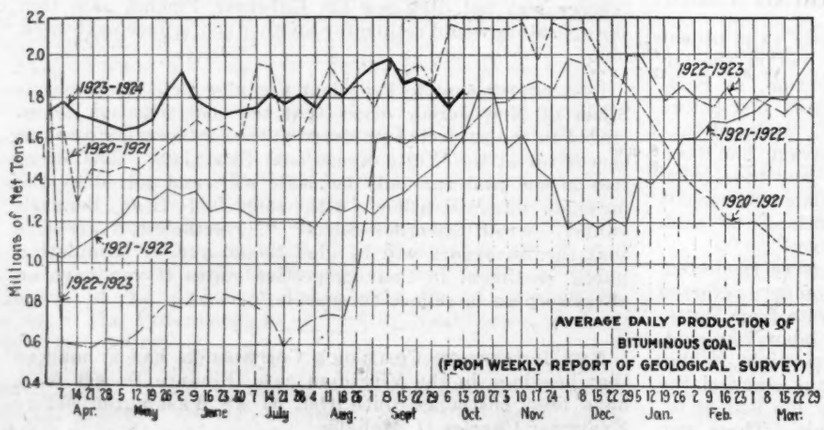
Output of anthracite was 2,015,000 net tons during the week ended Oct. 6, indicating that the industry has recovered from its strike. While the production showed a decrease of 10,000 tons from the preceding week it equals the weekly rate of output that prevailed just before the strike and exceeds by 60,000 tons the average weekly rate in the first five months of the present coal year. Cumulative production during the calendar year to Oct. 13 amounted to 73,279,000 tons, which is more than two and a quarter times that of the corresponding period for 1922. Domestic sizes of anthracite are in heavy demand, but the steam coals are hard to move.



	Week Ended Oct. 8	Season to Oct. 8
Cargo	785,199	22,799,322
Fuel	53,311	1,245,839
Totals	838,510	24,045,161

Movement of coal from the lower Lake ports remains around 800,000 net tons weekly, with cumulative shipments of cargo and fuel coal for the season totaling about 24,045,000 tons.

There is no activity in the export market. Inquiries are few and chartering of vessels is on a slow scale.



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Sept. 22	9,747,000	11,454,000
Sept. 29 (*a*)	9,822,000	11,347,000
Oct. 6 (*b*)	9,736,000	10,782,000
Daily average	1,623,000	1,797,000
Calendar year	280,751,000	424,257,000
Daily av. cal. year	1,186,000	1,796,000
ANTHRACITE		
Sept. 22	1,897,000	877,000
Sept. 29	1,982,000	2,025,000
Oct. 6	1,994,000	2,015,000
COKE		
Sept. 29 (*b*)	162,000	321,000
Oct. 6 (*a*)	173,000	313,000
Calendar year	4,958,000	14,815,000

(*a*) Subject to revision. (*b*) Revised from last report.

There is no sign of improvement at Hampton Roads, but dumpings there for all accounts during the week ended Oct. 11 was 339,332 net tons, an increase of 15,239 tons from the previous week.

Bituminous screened coals, Welsh anthracite and coke are practically out of the market as substitutes for anthracite. There are few inquiries being received, while prices for coke show a further decline from last week.

Middle West Still Unhappy

The whole Midwest coal region continued in a state of funk during the past week. Warm weather slacked down lump sales and stalled practically everything except a little call for fine coal. The shortening of work time had the effect of tightening up a trifle on screenings prices, which last week appeared to be going down without a bottom to touch. A slight rebound was noticed in southern Illinois screenings on the Chicago market, lifting the "low" spot quotation from $1 to about $1.20, and central Illinois from 60c. to about 75c. Improvement in prices that are as low as those, however, is not particularly stimulating when the domestic sizes are not gaining strength.

The mining fields of Illinois are all suffering from "no bills." This affliction has spread from the fine sizes and nut up to domestic lump in the central Illinois territory, though in the Standard district, which offers the cheapest coal in the state, several mines are oversold on lump. Most of the operations in that field can place all the lump they can load at $2.50@$3.15. Shutdowns throughout the state and in Indiana are growing more numerous week by week.

St. Louis at a Standstill

Domestic business in St. Louis is at a standstill. Dealers' trucks and wagons are laid up. Yards are billed up, coal is on demurrage and yard owners are cancelling orders and stopping shipments. Reports from the country show that a similar condition exists everywhere throughout the Middle West on account of mild weather. The little call in evidence has been for a middle grade of medium-priced coal. Some dealers are eliminating Franklin County altogether. Wagonload steam shows some improvement and continues to hold its own in a small way. Carload steam

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Oct. 16 1922	Oct. 1 1923	Oct. 8 1923	Oct. 15 1923†
Smokeless lump	Columbus	$6.75	$6.10	$6.10	**$6.25@$6.50**
Smokeless mine run	Columbus	6.00	3.10	3.05	2.85@ 3.25
Smokeless screenings	Columbus	5.50	2.35	2.25	2.15@ 2.40
Smokeless lump	Chicago	6.00	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	5.60	2.85	2.85	2.75@ 3.00
Smokeless lump	Cincinnati	6.60	6.10	6.10	*5.75@ 6.00*
Smokeless mine run	Cincinnati	5.95	2.75	2.75	*2.00@ 3.00*
Smokeless screenings	Cincinnati	5.80	1.85	1.60	1.25@ 2.00
*Smokeless mine run	Boston	7.20	4.80	4.80	*4.60@ 4.75*
Clearfield mine run	Boston	4.25	2.20	2.15	*1.50@ 2.50*
Cambria mine run	Boston	4.50	2.85	2.75	*2.25@ 3.00*
Somerset mine run	Boston	4.30	2.35	2.35	*2.00@ 2.75*
Pool 1 (Navy Standard)	New York	5.25	3.25	3.10	3.00@ 3.25
Pool 1 (Navy Standard)	Philadelphia	.....	3.25	3.20	*3.00@ 3.30*
Pool 1 (Navy Standard)	Baltimore	5.40	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	4.65	2.50	2.35	2.25@ 2.50
Pool 9 (Super. Low Vol.)	Philadelphia	4.35	2.60	2.55	*2.35@ 2.60*
Pool 9 (Super. Low Vol.)	Baltimore	4.60	2.40	2.40	*2.25*
Pool 10 (H.Gr.Low Vol.)	New York	4.10	2.10	2.05	1.90@ 2.25
Pool 10 (H.Gr.Low Vol.)	Philadelphia	3.60	2.15	2.10	*1.90@ 2.20*
Pool 10 (H.Gr.Low Vol.)	Baltimore	4.35	2.25	2.25	*2.15*
Pool 11 (Low Vol.)	New York	3.50	1.85	1.85	1.75@ 2.00
Pool 11 (Low Vol.)	Philadelphia	3.25	1.85	1.85	*1.70@ 1.85*
Pool 11 (Low Vol.)	Baltimore	4.10	2.00	2.00	*1.80*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	3.85	1.75	1.65	1.50@ 1.85
Pool 54-64 (Gas and St.)	Philadelphia	3.75	1.75	1.70	*1.55@ 1.80*
Pool 54-64 (Gas and St.)	Baltimore	4.05	1.60	1.60	**1.75**
Pittsburgh sc'd gas	Pittsburgh	5.25	2.55	2.55	2.50@ 2.60
Pittsburgh gas mine run	Pittsburgh	3.60	2.25	2.20	2.15@ 2.25
Pittsburgh mine run (St.)	Pittsburgh	3.60	2.05	1.85	1.75@ 2.00
Pittsburgh slack (Gas)	Pittsburgh	3.85	1.25	1.20	1.15@ 1.30
Kanawha lump	Columbus	6.25	3.15	3.15	2.85@ 3.50
Kanawha mine run	Columbus	4.50	1.85	1.85	1.75@ 2.00
Kanawha screenings	Columbus	3.60	1.05	.95	.90@ 1.00
W. Va. lump	Cincinnati	6.25	3.50	3.35	3.25@ 3.50
W.Va. Gas mine run	Cincinnati	4.60	1.25	1.35	**1.35@ 2.00**
W. Va. Steam mine run	Cincinnati	3.75	1.75	1.35	**1.35@ 2.00**
W. Va. screenings	Cincinnati	4.00	1.10	.85	*.65@ 1.00*
Hocking lump	Columbus	5.45	3.10	3.10	*2.85@ 3.25*
Hocking mine run	Columbus	3.50	1.85	1.85	1.75@ 2.00
Hocking screenings	Columbus	3.25	1.05	.95	.90@ 1.00
Pitts. No. 8 lump	Cleveland	3.81	2.60	2.60	*2.15@ 3.00*
Pitts. No. 8 mine run	Cleveland	3.56	1.95	1.95	*1.85@ 1.95*
Pitts. No. 8 screenings	Cleveland	3.31	1.15	1.10	*.95@ 1.15*

Midwest	Market Quoted	Oct. 16 1922	Oct. 1 1923	Oct. 8 1923	Oct. 15 1923†
Franklin, Ill. lump	Chicago	$5.35	$4.05	$4.05	$3.75@$4.35
Franklin, Ill. mine run	Chicago	4.50	2.85	2.60	2.25@ 3.00
Franklin, Ill. screenings	Chicago	3.25	1.30	1.25	**1.20@ 1.50**
Central, Ill. lump	Chicago	5.10	3.10	3.10	3.00@ 3.25
Central, Ill. mine run	Chicago	3.60	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	2.35	.95	.70	**.75@ .90**
Ind. 4th Vein lump	Chicago	5.10	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	4.60	2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings	Chicago	3.25	1.25	1.20	1.15@ 1.30
Ind. 5th Vein lump	Chicago	5.10	2.50	2.50	2.25@ 2.75
Ind. 5th Vein mine run	Chicago	3.75	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	2.85	1.05	.80	.75@ .90
Mt. Olive lump	St. Louis	.....	3.00	3.10	3.00@ 3.25
Mt. Olive mine run	St. Louis	.....	2.25	2.25	2.20@ 2.30
Mt. Olive screenings	St. Louis	.....	1.25	1.25	1.20@ 1.30
Standard lump	St. Louis	4.25	2.80	3.00	2.90@ 3.15
Standard mine run	St. Louis	3.35	2.05	2.05	1.80@ 2.30
Standard screenings	St. Louis	2.10	.55	.55	.50@ .60
West Ky. lump	Louisville	5.05	2.55	2.55	2.50@ 2.65
West Ky. mine run	Louisville	3.00	1.85	1.75	1.50@ 2.00
West Ky. screenings	Louisville	2.85	.75	.55	.50@ .65
West Ky. lump	Chicago	4.10	2.60	2.60	2.50@ 2.75
West Ky. mine run	Chicago	3.50	1.95	1.75	1.50@ 2.00
South and Southwest					
Big Seam lump	Birmingham	3.25	3.75	3.75	3.65@ 3.90
Big Seam mine run	Birmingham	2.75	1.95	1.95	1.75@ 2.15
Big Seam (washed)	Birmingham	3.25	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	6.25	3.35	3.35	3.25@ 3.50
S. E. Ky. mine run	Chicago	4.75	2.25	2.25	2.00@ 2.50
S. E. Ky. lump	Louisville	6.75	3.25	3.25	*3.00@ 3.25*
S. E. Ky. mine run	Louisville	4.35	2.00	2.00	1.75@ 2.25
S. E. Ky. screenings	Louisville	4.10	1.05	.85	.75@ 1.00
S. E. Ky. lump	Cincinnati	6.75	3.60	3.25	*3.00@ 3.25*
S. E. Ky. mine run	Cincinnati	4.10	1.60	1.35	**1.25@ 1.85**
S. E. Ky screenings	Cincinnati	4.00	1.00	.85	*.65@ 1.00*
Kansas lump	Kansas City	5.75	4.50	5.00	5.00
Kansas mine run	Kansas City	4.25	3.50	3.50	3.50
Kansas screenings	Kansas City	2.50	2.60	2.25	2.25

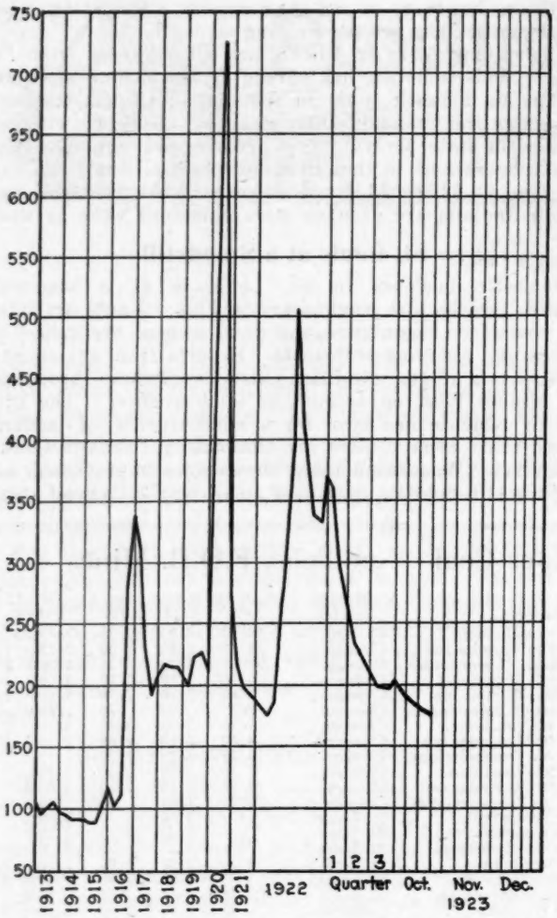
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922 Independent	Dec. 26, 1922 Company	Oct. 8, 1923 Independent	Oct. 8, 1923 Company	Oct. 15, 1923† Independent	Oct. 15, 1923† Company
Broken	New York	$2.34	$9.00	$7.75@$8.25	$9.60@12.25	$8.00@$9.25	$9.60@12.25	$8.00@$9.25
Broken	Philadelphia	2.39	.....	7.90@ 8.10	.....	.....	.....	.....
Egg	New York	2.34	$9.25@12.00	8.00@ 8.35	9.85@12.25	8.75@ 9.25	9.85@12.25	8.75@ 9.25
Egg	Philadelphia	2.39	9.25@11.00	8.10@ 8.35	9.85@12.20	8.75@ 9.25	9.85@12.20	8.75@ 9.25
Egg	Chicago*	5.06	12.50@13.00	7.20@ 8.25	9.60@12.50	8.00@ 8.35	9.60@12.50	8.00@ 8.35
Stove	New York	2.34	9.25@12.00	8.00@ 8.35	9.85@12.25	8.75@ 9.25	9.85@12.25	8.75@ 9.25
Stove	Philadelphia	2.39	9.25@11.00	8.15@ 8.35	9.85@12.20	8.90@ 9.25	9.85@12.20	8.90@ 9.25
Stove	Chicago*	5.06	12.50@13.00	7.35@ 8.25	9.60@12.50	8.00@ 8.35	9.60@12.50	8.00@ 8.35
Chestnut	New York	2.34	9.25@12.00	8.00@ 8.35	9.85@12.25	8.75@ 9.25	9.85@12.25	8.75@ 9.25
Chestnut	Philadelphia	2.39	9.25@11.00	8.15@ 8.35	9.85@12.20	8.90@ 9.25	9.85@12.20	8.90@ 9.25
Chestnut	Chicago*	5.06	12.50@13.00	7.35@ 8.35	9.60@12.50	8.00@ 8.35	9.60@12.50	8.00@ 8.35
Range	New York	2.34	.....	8.25	.....	9.00	.....	9.00
Pea	New York	2.22	7.00@11.00	6.15@ 6.30	6.75@ 8.00	6.15@ 6.65	**6.75@ 8.25**	6.15@ 6.65
Pea	Philadelphia	2.14	7.00@ 8.00	6.15@ 6.20	6.75@ 9.00	6.35@ 6.60	6.75@ 9.00	6.35@ 6.60
Pea	Chicago*	4.79	7.00@ 8.00	5.49@ 6.03	6.00@ 6.75	5.40@ 6.05	6.00@ 6.75	5.40@ 6.05
Buckwheat No. 1	New York	2.22	4.00@ 5.00	4.00@ 4.10	2.50@ 3.50	3.50	2.50@ 3.50	3.50
Buckwheat No. 1	Philadelphia	2.14	5.00	4.00	3.00@ 3.50	3.50	*3.00@ 3.50*	3.50
Rice	New York	2.22	3.00@ 3.25	2.75@ 3.00	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Rice	Philadelphia	2.14	2.50@ 2.75	2.75@ 3.00	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Barley	New York	2.22	1.75@ 2.00	1.50@ 2.00	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Barley	Philadelphia	2.14	1.00@ 1.75	2.00	1.50	1.50	*1.25@ 1.50*	1.50
Birdseye	New York	2.22	.....	2.10	.....	1.60	.....	1.60

*Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923			1922
	Oct. 15	Oct. 8	Oct. 1	Oct. 16
Index	185	190	196	368
Weighted average price	$2.24	$2.30	$2.37	$4.45

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

is hard to find. There is no demand for smokeless, anthracite or coke. Country steam is about as hard to find as in St. Louis and everybody is waiting for cold weather.

Kentucky Prices Bump Bottom

The situation in western Kentucky is anything but satisfactory. Lack of steam demand has resulted in screenings working lower, until the market is quoted as low as 50c. a ton for pea and slack and 75c. a ton on nut and slack, while mine-run can be had at from $1.50 upward. In prepared coals the market holds fairly well, but an average of top prices of prepared and top prices of screenings makes a realization too low to allow many mines to break even.

Car supply is reported at from 87 per cent on one line to 134 per cent on another railroad, which is making it possible to load more cars than the market can well absorb. Steam demand while good is being supplied by very cheap screenings.

The Louisville coal trade is reported as quite dull with a little coal moving at give-away prices. Steam coal in Louisville is lower than at any time since the early part of 1922. Western Kentucky screenings are being offered at 50c. a ton and up, while western Kentucky as well as eastern Kentucky nut and slack is being offered at a minimum of 75c. and ranging up to $1, with some 60c. stuff reported from eastern Kentucky. With screenings so cheap the demand for mine-run is almost nothing.

Northwestern Trade Barely Alive

During the past week there has been little doing in the Northwest except a casual movement of anthracite. The increase of from 25c. to 80c. on domestic sizes at the various Northwestern markets had a restraining influence on even that standard trade. Warm weather simply flattened the market out leaving little to look forward to except a cold snap.

This condition produced some reductions in prices of various soft coals. At Milwaukee retailers cut Pocahontas screened coal $1.25; mine-run, $2.50, and smithing coal, $3. West Virginia screened was shaded 25c., and Illinois and Indiana domestic sizes, $1.50. These cuts resulted from reductions at wholesale of nearly the same amounts. Kanawha gas mine-run was dropped 50c. At Duluth no further reductions were made. In the region about Minneapolis the market is so glutted that various cuts have been made to hold business and much "snowbird" coal has penetrated into the territory. There is little demand anywhere in the Northwest for coke or the briquets around which a small industry has developed.

Shipments from the docks at Duluth-Superior harbor continued heavy last month, a total of 23,174 cars of coal going out. This compares with 23,914 cars in August and 16,178 cars in September of last year. Shipments to the docks continued good last week with thirty-six cargoes arriving, of which three were hard coal. Twenty-seven cargoes are reported on the way, of which three are hard. Every indication points to a continuation of the movement. It is safe to say, from present indications, that a surplus of bituminous will be on the docks when navigation opens in the spring.

October receipts at Milwaukee by lake thus far aggregate 42,200 tons of anthracite and 144,090 tons of soft coal, making the season's receipts 675,938 tons of the former and 2,229,434 tons of the latter, or 2,905,372 tons in all.

Western Market Low Too

The Southwest is able to sell a little domestic lump coal these days, but little else. Steam continues to drag heavily. Further west, in the mountain country, Colorado market conditions remain practically unchanged with the trade experiencing about as low a fall as the old inhabitants can remember. The mines are getting about 60 per cent running time, however, which would not be considered bad in many another coal region.

Utah operators feel a slight increase in business coming in not only from the mountain states but from the coast and the great Northwest. Running time averages about four and a half days. Domestic sizes sell rather easily but steam continues draggy. A suggestion of car shortage has appeared, but the trade generally sees no sound reason why it should become acute.

Ohio Markets Are Lifeless

Retail dealers and steam coal users in the Columbus market are playing a waiting game and there is no life in the situation. Householders are not buying to any extent and retailers are in the market for only sufficient coal to keep their stocks intact. Retail prices remain steady. Screenings are moving the slowest; some mines in the Hocking Valley and Pomeroy fields closed down because of their inability to sell their slack output. Mine-run, while not nearly as weak as screenings, is being bought according to present needs. Reserve stocks of steam sizes are sufficient for from sixty to seventy-five days. Cleveland reports that the dullness in market conditions is being felt now to a greater extent than a week ago. Inquiries are scarce and distress coal is affecting spot prices, as well as demand. Steam coal is not being stored to any extent. The general market is practically a buyers' market. Notwithstanding this condition, receipts of coal at Cleveland last week were reported as greater than in any week since the end of March, being about 300 cars over those of the preceding week. This increase, it is

said, is due to large disposals of distressed coal and the fact that a good quantity of coal is being bought on track rather than on orders being placed for shipment from the mines.

Markets for smokeless coals at Cincinnati begin to show signs of sliding, the dullness and weakness in Chicago and interior points reflecting on the local situation. Lake shipments are slowing up, which will result in the necessity of other means of disposal being found. Rejections continue to grow. Retail prices show little change locally, except where in a few instances dealers have cut the price on slack to $4.25 and domestic lump to $7.50. Smokeless grades remain unchanged.

Reports from 441 mines received by the Southern Ohio Coal Exchange show output to have been 171,714 tons during the week ended Sept. 29.

Pittsburgh Buyers Hold Off

The Pittsburgh market continues in the dumps, and everywhere it is said that it is almost impossible to sell coal. There is no well-established price on any description of coal, and sales are made at figures according to circumstances, but while the market is weak it is not certain that the average of all transactions is at a materially lower level than last week. Buyers seem to be particularly conservative about taking hold. There is a disposition to reduce stocks rather than to increase them. This, at any rate, is the attitude of some steel mills having byproduct coke ovens. Market conditions in Buffalo are flat, with complaints of poor business increasing.

New England Market in Bad Shape

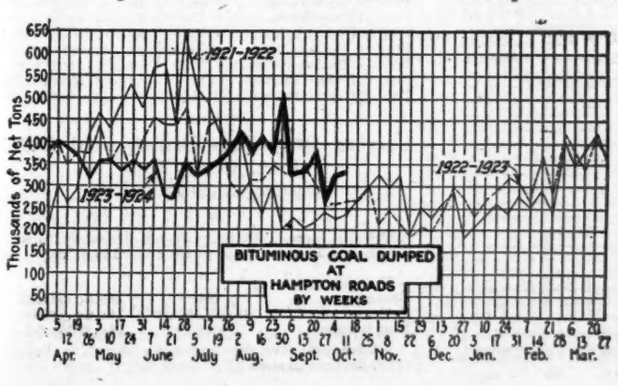
To the trade in New England it seems as if the steam-coal market could not possibly be in worse shape. With factors pressing buyers to absorb cargoes that are on the market it is only natural that prices should be further depressed. No. 1 coal has been offered at $5.80 per gross ton on cars Boston for spot shipment, and it is freely said that coal f.o.b. Hampton Roads could be purchased on offers down to $4.60, or possibly less. In all directions trade is stagnant.

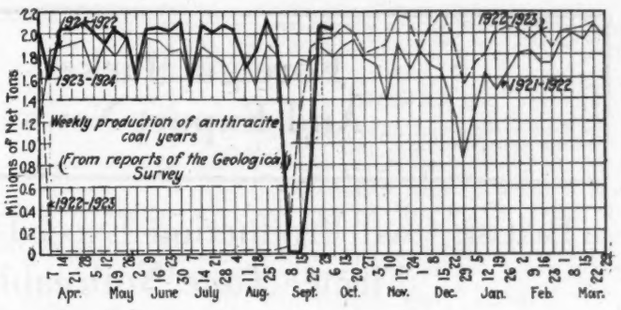
Even producers of quality grades from central Pennsylvania who supposed their output was reasonably well covered are seeking shipping instructions in the open market and offering material concessions from a price basis that was considered barely the cost of production. The less favorably known coals apparently find no market whatever, for nothing about them is heard in this market. Moshannon coals of fair grade are offering at $2 per net ton and more than a few Pennsylvania coals have netted much less than this figure when disposed of at New York and Philadelphia piers.

At Hampton Roads there are no signs of improvement. There are accumulations at the piers up to the point permitted by restricted output and all the agencies find the going extremely hard.

Seaboard Soft Coal Market Quiet

The spot market for soft coal at New York is extremely quiet. Coal is plentiful and cargoes of distress coal can be picked up at prices below current quotations. Shipments of contract coals are being curtailed, with the result that fair tonnages of some of the better grades have been thrown into the open market. Conditions at Philadelphia show





no improvement and are far from satisfactory to those producers who some months ago elected to put the bulk of their tonnage on a spot basis. In order to keep their coals moving it is said that some producers holding contracts at high figures have been willing to modify those figures. The tidewater business at Philadelphia is being confined in the main to bunker loading, no clearances being reported last week, nor were any charters registered for future sailings.

Considerable quantities of Pool 9 and 71 coals are being offered in the Baltimore market on a keen competitive basis, causing the demand for the cheaper coals to fall off. Gas coals are holding up well. The market in West Virginia is described by operators as bad everywhere without regard to the grade of coal offered. Low prices on both high and low volatiles are no incentive to buyers. In the southwest Virginia fields "no market" losses are said to be responsible for the greater part of the cut in production.

No improvement is noticed in the Birmingham market. The amount of spot business was smaller, if anything, than for the previous week. A fair amount of contract coal and for coke manufacture is moving from the mines. Furnace mines have curtailed production because of the blowing out of a number of furnaces.

Shipments of soft coal to Lake ports during the week ended Oct. 8 amounted to 838,510 net tons, a decrease of 1,720 tons when compared with the previous week.

Anthracite Demand Absorbs Output

While demand for anthracite domestic coals continues sufficiently strong to absorb the output, quotations for the independent product are easier but retail dealers are not showing a disposition to buy heavily of these coals when it is possible to take care of their trade with company coals. Larger shipments would be welcome, many yards being bare of supplies, the retail dealers delivering the coal as soon as it arrives. In some sections it is difficult to move pea coal, consumers sticking to their favorite sizes. Movement of the steam sizes is slow and the smaller producers are selling their product at prices far below company figures. Some producers and dealers are initiating an educational program to induce consumers to use a portion of these sizes with the larger coals.

The market for coke and bituminous screened coals has almost disappeared, although some retail dealers carry small stocks.

The steady decline in the production of beehive coke continued during the first week in October, production being estimated at 313,000 net tons, a decrease of 8,000 tons from the previous week. Production during September is estimated at 1,373,000 tons, as compared with 1,494,000 tons in August. Production of byproduct coke during September was 3,112,000 net tons.

Car Loadings, Surplusages and Shortages

	Cars Loaded — All Cars	Cars Loaded — Coal Cars
Week ended Sept. 29, 1923	1,097,274	200,970
Previous week	1,060,436	182,524
Same week in 1922	977,791	187,812

	Surplus Cars — All Cars	Surplus Cars — Coal Cars	Car Shortage	
Sept. 30, 1923	41,745	5,651	15,331	5,439
Same date in 1922	5,843	3,486	.....	.....
Sept. 22, 1923	59,008	16,840	13,515	5,482

Foreign Market And Export News

British Coal Production Exceeds Demand; Firmer Tone Noticeable

Although production exceeds the demand, output of coal of Great Britain's mines is increasing, a cable to *Coal Age* giving the output during the week ended Sept. 29 at 5,575,000 tons, as compared with 5,005,000 tons the previous week.

A firmer tone is noticeable in the South Wales market and sellers are less disposed to make concessions for prompt shipments. The possibility of an early settlement of the Ruhr problem, an increase in German coal output and its effect on European coal markets are some of the factors which are reflected in the waiting attitude adopted by customers towards forward buying. European business is poor, except the trade with France which is good. Italian orders have increased slightly. Belgian buying is below normal, and Dutch and German business is quiet.

Improved demand for better classes of large coal has absorbed much of the accumulated stock, and also created a steadier tone. Some of the mines are badly placed, and there is plenty of coal to satisfy existing demands.

The Newcastle market is unchanged. The only bright feature in the market is that the operators have been able to book up a certain amount of fairly steady business which will keep the pits busy through most of this month.

Paris Retail Dealers Advance Prices

The French coal market remains firm. Retail dealers are receiving inquiries while prices are steady. Although conditions in the Ruhr are clearing, it is expected sometime will elapse before coal deliveries will become normal, and before any agreement is made effective the French mines, with the assistance of British, Belgian and Dutch coals, will have to meet the demand.

At its recent session the Miners National Congress asked the Federal Board to discuss with the various committees the readjusting and raising of wages throughout the mining regions.

Retail dealers in Paris have increased the prices on all coals, with the exception of British anthracite sizes, from 5 fr. to 12 fr. per ton.

During August coal production of the Nord and Pas-de-Calais mines amounted to 1,853,298 metric tons, as compared with 1,723,850 tons in July, while the output of coke from the same districts during the same period was 125,231 tons as compared with 118,690 tons in July.

United States August Exports by Custom Districts

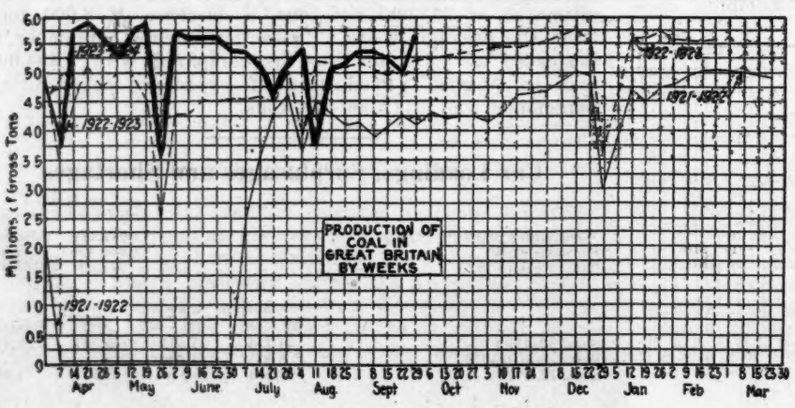
(In Gross Tons)

	Anthracite	Bituminous	Coke
Maine and New Hampshire	61	4,084	430
Vermont	930	605	1,036
Massachusetts	54	.....	.....
St. Lawrence	115,843	219,971	4,064
Rochester	79,888	71,473	83
Buffalo	202,047	247,080	34,110
New York	12,442	93	1,922
Philadelphia	4,090	17,182	1,202
Maryland	.....	128,033	10,117
Virginia	.....	267,685	11,255
South Carolina	.....	23,775	.....
Florida	.....	2,799	499
Mobile	.....	1,162	.....
New Orleans	.....	636	56
San Antonio	.....	355	154
El Paso	282	3,800	1,045
Arizona	70	2,013	4,546
Los Angeles	.....	9	.....
San Francisco	.....	200	9
Washington	.....	468	20
Alaska	.....	150	.....
Dakota	7,951	7,727	1,736
Duluth and Superior	7,909	1,650	253
Michigan	199	103,003	13,086
Ohio	10,709	1,013,151	13,614
Totals	442,475	2,117,084	99,237

Market at Hampton Roads Soft

Business at Hampton Roads was exceedingly dull last week, with the market softening, movement at the piers falling off, and inquiries slackening. Indications were that the business for the first half of the month would approach the low record for any similar period for the year.

Export business showed a tendency to decline, while bunkers was weak, and coastwise trade scarcely holding its own. The tone of the market was weak, and the outlook not bright. Shippers attributed the inactivity of the market to the fact that reserved stocks were being consumed.



Coal Strike Halts Czechoslovak Industry

The Czechoslovakian coal strike, which has completely stopped coal and partially coke production, is now in its sixth week, and threatens serious industrial results, says Acting Commercial Attaché, H. L. Groves in a cable to the Department of Commerce. A reduction in production of the principal Czechoslovak industries will probably result if this strike is continued. An embargo has been placed on all domestic coal stocks by the government and sales are permitted only by special license. The stocks of coal on hand, however, are reported as still sufficient to meet all the current essential needs of the government and industries. Imports of Silesian coal to relieve the situation are increasing considerably.

Export Clearances, Week Ended Oct. 13, 1923

FROM BALTIMORE

	Tons
For Cuba:	
Br. SS. Berwindale	1,016
For Italy:	
Br. SS. Grelstone	7,297

COKE

For Chile:	
Br. SS. Republic	1,465

FROM HAMPTON ROADS

For Newfoundland:	
Dan. SS. Gorm, for Bathurst	2,923
Du. SS. Svanhild, for Bathurst	3,013
For West Indies:	
Nor. SS. Bur, for Fort de France	6,107
Dan. SS. Josey, for Cuaracao	3,763
For Cuba:	
Br. SS. Berwindvale, for Havana	6,778
For Italy:	
Jap. SS. Egypt Maru, for Porto Ferrajo	8,580
For Brazil:	
Br. SS. Nilemede, for Para	5,985

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	Oct. 4	Oct. 11
Cars on hand	1,350	1,194
Tons on hand	77,111	67,277
Tons dumped for week	86,709	113,677
Tonnage waiting	22,800	1,900
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,890	1,761
Tons on hand	112,050	102,350
Tons dumped for week	84,158	110,814
Tonnage waiting	10,958	10,100
C. & O. piers, Newport News:		
Cars on hand	1,899	2,120
Tons on hand	99,975	102,500
Tons dumped for week	118,502	78,484
Tonnage waiting	6,800	4,000

Pier and Bunker Prices, Gross Tons

PIERS

	Oct. 6	Oct. 13†
Pool 9, New York	$4.95@$5.35	$4.95@$5.35
Pool 10, New York	4.50@ 5.00	*4.50@ 4.90*
Pool 11, New York	4.35@ 4.75	*4.25@ 4.60*
Pool 9, Philadelphia	5.30@ 5.55	*5.30@ 5.50*
Pool 10, Philadelphia	4.55@ 5.10	*4.50@ 5.05*
Pool 11, Philadelphia	4.30@ 4.65	*4.25@ 4.60*
Pool 1, Hamp. Roads	4.60@ 4.75	**4.75@ 4.85**
Pools 5-6-7 Hamp. Rds.	4.40	*4.30@ 4.40*
Pool 2, Hamp. Roads	4.40	*4.25@ 4.40*

BUNKERS

Pool 9, New York	5.25@ 5.65	5.25@ 5.65
Pool 10, New York	4.80@ 5.30	*4.80@ 5.20*
Pool 11, New York	4.65@ 5.05	*4.55@ 4.90*
Pool 9, Philadelphia	5.55@ 5.95	*5.50@ 5.90*
Pool 10, Philadelphia	5.00@ 5.40	*5.00@ 5.35*
Pool 11, Philadelphia	4.60@ 4.90	*4.55@ 4.85*
Pool 1, Hamp. Roads	4.75	**4.75@ 4.85**
Pool 2, Hamp. Roads	4.40	*4.25@ 4.40*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Oct. 6	Oct. 13†
Admiralty, large	27s.6d.@28s.6d.	27s.6d.@28s.6d.
Steam smalls	17s.6d.@18s.6d.	**18s.@19s.**
Newcastle:		
Best steams	24s.	**24s.6d.@25s.**
Best gas	24s.@24s.6d.	**24s.6d.@25s.**
Best bunkers	23s.@24s.	**24s.@24s.6d.**

† Advances over previous week shown in heavy type, declines in *italics*.

News Items From Field and Trade

ALABAMA

An adjustment of wages by the Woodward Iron Co. at its Dolomite Mines Nos. 1 and 2 resulted in a temporary suspension of work on the part of miners at those operations on Oct. 1. However, all differences were satisfactorily settled and the men returned to work. The slump in the price and demand for pig iron and coke, officials explained, necessitated a reduction in production cost in order to allow any margin of profit on pig iron and coke in the present market. Operations at other mines where the reduction was put into effect were not interrupted.

The Town Creek coal mine, near Empire, Walker County, has been sold by J. E. Creel to Elmer Faucett, of Dora, for a consideration of $10,000.

The Cullman Property Co., of Cullman, has **sold to Charles Lark, of New York, mineral rights on 40,000 acres of lands** in Winston, Morgan and Cullman counties for a reported consideration of $100,000.

Fourteen hundred acres of coal land has been acquired in Bibb County, in the Cahaba coal field, **by W. R. Young, George W. Randall and associates.** These lands are on the Louisville & Nashville and the Southern railroads and carry the Thompson seam of coal, one of the best domestic coals in the state. It is understood that the property will be developed at an early date by the new owners, who are experienced operators and are now interested in several companies operating in the Cahaba field.

The Baker Towboat Co., of Tuscaloosa, has separated from its organization the **Baker Coal Co., with a capital stock of $10,000.** Officers of the company are: J. E. Baker, president; G. E. Little, vice-president and general manager, and A. T. Baugh, secretary-treasurer, all of Tuscaloosa.

ALASKA

The bridge on the branch of the Alaska R.R. to the Healy River coal field, according to a telegram received Oct. 5 at the Interior Department, Washington, **will be completed this month,** making the coal mined in this district accessible for domestic and railroad consumption.

ARKANSAS

Judge Frank A. Youmans, in U. S. District Court, recently denied a motion to dismiss the suit of the Coronade Coal Co., Fort Smith, Ark., against the United Mine Workers of America. Judgment for $2,223,000 is asked.

CALIFORNIA

Charles Piez, president of the Link-Belt Company, Chicago, announces the **purchase of the Meese & Gottfried Co.,** of San Francisco, Los Angeles, Seattle and Portland. The improvement in distributing facilities effected by the consolidation and the additional manufacturing facilities acquired are expected to give the rapidly-growing industries of the Pacific coast highly economical and efficient service. The new organization will be known as Link-Belt Meese & Gottfried Co., with headquarters at San Francisco. The officials will be: Charles Piez, chairman of the board; B. A. Gayman, president; Harold H. Clerk, vice-president and sales manager; Leslie W. Shirley, treasurer; Richard W. Yerkes, secretary.

COLORADO

A gas explosion in the mine of the Midwest Coal Co. at Palisades, Oct. 7, killed Walter Scott, the manager, and five workmen. Investigation into the explosion was started by Coroner E. A. Krohn, Oct. 8, when all but two bodies had been removed.

ILLINOIS

The Hickory Grove Coal Co., an organization with headquarters in Rochester, N. Y., has purchased 120 acres of land about two miles south of Riley, for a stripping mine, and expects to begin loading coal soon. The mine may have a capacity of about 2,000 tons a day or about 40 carloads. The company has purchased steam shovels and other equipment. The E. I. & T. H. lines are at present building switches from their main lines to the new field. The new concern has extensive stripping mines in Ohio and West Virginia. L. A. Fitch, of Rochester, N. Y., is president of the company and the local operations will be supervised by J. A. McLean, recently in charge of the company's mine at Clarksburg, W. Va.

The Central Illinois Public Service Co. through a consolidation becomes the owner of the mammoth power station under construction on the Mississippi river at Grand Tower, and of the double-circuit 66,000-volt steel tower transmission line now being built to deliver energy from Grand Tower to West Frankfort, where it will be redistributed through the coal fields and communities of southern Illinois. Electric service is rendered 107 active mines in the coal fields of central and southern Illinois. Although more than 48,000 hp. is furnished to serve coal mines, the present connected business is slightly less than 32 per cent of the total amount of business of this character adjacent to the company's transmission lines.

The Madison Coal Corporation is erecting a new mine-rescue building at the Crystal Mine in Tilden. This new building will be equipped with every modern appliance for rescue work. The company also is building a new wash house and when this done it will have 621 lockers and 26 showers. This mine now employs 500 men.

Donk Brothers Coal & Coke Co. at Edwardsville, has completed a new shaft and tipple and coal is now being hoisted through the new skip. About 300 men are being employed at the mine. As soon as the underground workings can be extended the mine will employ 200 additional men.

Dr. F. C. Honnold, head of the Honnold Coal Bureau of Chicago, made an illustrated talk on "The Story of Coal" before the Chicago Rotary Club, Oct. 16.

The Dodds mine, near Carrier Mills, owned by the Dodds Coal Co., **has resumed operations.** The company has just completed installation of new screens and cleaning machinery which will give the mine a cleaner product than heretofore.

At Marion a night school in coal mining is now in operation under the supervision of Prof. H. W. Bradbury. About 200 miners are enrolled. Courses in technical training and in branches that are difficult for practical miners to obtain are offered. Graduates will be able successfully to pass state examinations for promotion in mining.

The Harrisburg Colliery Co. has completed the erection of 25 modern four-room cottages, near its plant at Harrisburg, to help relieve the housing shortage there.

Electrification of hoisting and other machinery **at mine No. 16 of the Old Ben Coal Corporation at Sesser is about complete.** With the exception of a few minor repairs on the tipple and additional work about the mine, everything is in readiness to resume hoisting again.

John Meyers has resigned as mine manager of the Majestic mine, at Du Quoin, and will accept a position as superintendent for a large coal company at Johnston City.

W. K. Kavanaugh, head of the Southern Coal Coke & Mining Co., which operates in the Belleville region, **is sponsoring a new type of coal burner for domestic furnaces.** It is called "The Electric Furnace Man." It is a coal hopper and small motor-driven stoker to be installed under any household furnace, aimed to burn any kind of small coal, even Standard district screenings, the cheapest coal now on the market, without making any smoke. The device has just been put on the market.

Two new coal mines near Lewistown nave opened and coal is being hoisted. The Lindquist and Fleming Brothers mine, located on the John Bowen farm, is on a lease of 105 acres of thin vein coal. E. W. Duvall has begun the mining of coal from the shaft on the Griffith farm at the end of North Railroad Street. Robert Nahm is operating his mine in the east part of Lewistown at full capacity. Lewistown now has three mines.

INDIANA

In accordance with agreements reached several weeks ago, **concessions for mining coal underlying the Wabash River** from the State Department of Conservation to the **Grasselli Chemical Co.** and the **Miami Coal Co.,** have been recorded at Terre Haute. The companies will pay a royalty of 10c. a ton. Engineers of the departments are at work to determine the amount of coal taken from the state-owned ground before the agreement, to ascertain what sum is due to the state for coal already mined.

Reports from Clinton are to the effect that a party of **Terre Haute men have been taking options on Helt Township coal land** the past few weeks and it is now definitely known that options have been obtained on about 2,000 acres. The options are taken on the big waste of farm land lying between St. Bernice and Summit Grove. There is believed to be a rich deposit of coal under most of the land. One hundred dollars an acre has been the prevailing price for coal lands in that township.

Clem J. Richards was appointed receiver for the Sugar Valley Coal Co. Monday, Oct 8 by Judge John E. Cox in Superior Court of Vigo County immediately after a suit had been filed in that court against the company by Frank M. Steiner, seeking payment of $5,000 alleged to be due and asking for a receiver. Mr. Richards' bond was fixed at $50,000 as receiver and he was directed by the court to close the mine and employ men to care for the property.

A movement for a uniform eight-hour day for all labor employed in connection with coal mining in District No. 11, U. M. W. of A., **has been launched** by local union 2,648, located at Shirkieville **in behalf of mine firemen.** The action taken by this local in the form of a resolution adopted sets forth that mine firemen are compelled to work ten and twelve hours a day, "which is not in line with the miners' constitution." The resolution places the local on record as favoring a uniform work day and calls upon other locals in the district which are in favor of a shorter work day for firemen to pass resolutions to that effect.

Suit for recovery of about $2,500 for rents due for use of coal lands was filed by Milton Webster against the Otter Creek Coal Co. in Superior Court at Terre Haute, recently. Along with the complaint was filed a copy of a contract between the two parties, in which the coal company guaranteed Webster $300 a year or more for use of his lands at 80c. a ton. According to the plaintiff, this sum has never been paid since Jan. 1, 1912.

KANSAS

Involuntary bankruptcy proceedings have been inaugurated in the Federal District Court in Fort Scott, Kan., against the Acme Coal & Mining Co., asserting the liabilities are $40,000 and assets half that amount. A Pittsburg bank is the principal creditor The Acme has been operating a steam-shovel mine on leased land at Gross, Crawford County.

A. W. Dickinson, formerly general superintendent of the Western Coal & Mining Co., with operations in Illinois, Kansas and Arkansas, has entered the service of the Union Pacific Coal Co. in the capacity of safety engineer. Mr. Dickinson will have direct charge of all matters pertaining to mine safety, the Union Pacific Coal Co. operating some twenty mines in the State of Wyoming.

The Buckeye Shale Brick Co. has been chartered with a capital of 2,000 shares, no par value, for the purpose of mining coal. Incorporators are M. E. Kundmiller, Jean B. Clyde, Ralph W. Edwards, Pat D. Collins and A. K. Strong.

Holmes Wager has been appointed general treasurer of the Western Coal & Mining Co., with headquarters in St. Louis. He succeeds Edward S. Johnson, who recently resigned to assume a connection with a St. Louis building and loan association. Mr Wager has been in the employ of the Western for 23 years. Beginning as billing clerk he became cashier and then general claim agent.

A new record for a single day's production in the Kansas field was established Oct. 5 by the Central Coal & Coke Co. in its mine No. 51, near Mingo. On that day the output from the one shaft was 1,433 tons. The mine had been idle two days. On Oct. 1 the production was 1,291 tons and on Oct. 2 it was 1,332 tons.

KENTUCKY

The coal operators association in Kentucky has decided to organize and maintain **a coal co-operative insurance company** of their own and carry their own risks. This step was taken as a protest against the action of the associated compensation insurance companies, which has filed with the Workmen's Compensation Board of the state an application to increase the compensation rate from a basic rate of $3.40 to $3.85.

The St. Bernard Coal Mining Co., of Earlington, operating a branch in Louisville under the management of W. B. Gathright, has arranged to install an exhibit at the second annual Better Homes and Building Exposition, during the week of Oct. 22. Mr. Gathright is planning to install a mine operation in miniature.

MINNESOTA

The County Attorney of Hennepin County has had an investigation on in Minneapolis for some days, seeking to ascertain **if there is any conspiracy existing which results in the high cost of coal.** The attempt has been made to show a collective understanding among members of the dock association as to high, uniform prices. This was disputed by the Twin City Coal Exchange, which is antagonistic to the docks. But exchange men testified that the prices were made at the instance of the producers and that the dock men had little to say about them. Dock association officers stated that the organization had nothing to do with prices. The advance of 75c. in anthracite due to the increase to the miners, will also be investigated. **It is estimated that the receipts of 900,000 tons of hard coal** for the season over the docks, now reduced to 160,000 tons, **must have been put in hiding in order to take advantage of the increase in price.** So the investigation is to be extended to the books and records of the railroads and dock concerns, to ascertain where the dock receipts have gone. County Attorney Olson expects to go to Duluth in search of evidence on this phase of the matter. The dock charge, amounting to $1.90, also is to be investigated.

MISSOURI

The mine at Mosby operated by the Mosby Coal Co., has been **leased by a new firm under the title of the Mosby Block Coal Co.** Of the new company, David Lodwick is president, and John S. Lodwick is secretary and treasurer. Both are from Domestic, Ia. The mine has been closed several months because of sand and water, but inspectors after an examination, predicted no more trouble would be experienced. They explained the flow as due to the release of a stratum of the fluid material from between two strata of limestone, which finally have come together, thus damming the flow.

W. J. Patterson, of St. Joseph, for the last twelve years connected with the F. M. Brinson Coal Co. in that city, has gone in the wholesale business for himself and opened an office in the Corby-Forsee Building.

W. K. Kavanaugh, president of the Southern Coal, Coke & Mining Co., of St. Louis, was appointed foreman of the new grand jury at St. Louis, which was recently impaneled for the October term of court.

One hundred and eighty miners employed by the Elmira Coal Co. in its mine at Elmira, **have returned to work, pending arbitration**, after having been out on strike six weeks as a result of a disagreement between the company and one of its men over a claim of $45. The room in which the man was working encroached upon a railway right of way, and he was laid off while another room was being made ready. He demanded $45 payment for this idle time. Other miners, thrown out of work by the same cause, made no claim against the company.

A. B. Jefferis has started the Big River Coal Co. at St. Louis. He is the son of J. A. Jefferis, well known in the Middle West as manager of the Kerens-Donnewald Coal Co.

MONTANA

The King Coal Mining Co. has been incorporated for $250,000 at Aberdeen, S. D., by James M. Brown, H. E. Kenyon and K. K. Kearney to purchase and operate the Star Coal Co.'s property at Musselshell.

OHIO

The October term of the U. S. District Court at Cincinnati shows **a number of coal disputes that will have to be ironed out** in the court.

The Columbus-Pocahontas Coal Co. has been organized by Columbus capitalists with a capital stock of $500,000, its principal office to be at Columbus. Interested as incorporators in the new concern are F. A. Mossgrove, H. N. Bargar, N. D. Kerns, R. T. McClure and W. T. Thompson, all of Columbus.

The Cincinnati Credit Bureau, backed by that branch of the American Wholesale Coal Association, **is again functioning.** Offices have been opened on the 29th floor of the Union Central Building, and J. E. Phillips, who was connected with Sanborn's Blue Book for several years, is now in charge.

The Columbus Board of Education will open bids Nov. 8 for 1,000 tons of Hocking nut, pea and slack for the Central High School building, which is nearing completion. The proposal terms provide that it must be free from dirt and must be delivered to the building.

The City Ice & Fuel Co., Columbus plans the building of a large retail yard at West Broad St., and the Big Four tracks to supplement yards already in operation. The yard will be equipped with modern loading and unloading equipment as well as other machinery.

The Columbus-Pocahontas Coal Co., which will have headquarters in the Hartman Bldg., Columbus, has been chartered under the laws of West Virginia with an authorized capital of $300,000 for the purpose of operating mines and holding coal properties in the smokeless field. No announcement has been made of the properties to be taken over. The incorporators are N. D. Kerns, R. D. McClure, W. T. Thompson and F. A. Mossgrove.

Papers have been filed with the Secretary of State **increasing the authorized capital of the Long Hollow Coal Co.**, of Columbus, from $25,000 to $120 000.

The Swan Creek Lumber & Supply Co., Toledo, has purchased the retail coal business formerly conducted by the Fort Meigs Coal Co. The deal was closed Oct. 1 and the yard temporarily has been placed under the management of Henry S. Wingard. A new company, to be known as the Swan Creek Coal & Coke Co., will be chartered to handle the retail coal business from the new location. Improvements to the amount of $25,000 are planned.

The Moss Run Coal Co., Bellaire, has been chartered with a capital of $30,000 to mine coal and operate coal mines. Incorporators are Robert C. Williams, Herman R. White, R. N. Shaver, Fred McConn and Robert C. Brown. Mail will reach this company at R. F. D. No. 1.

Fifty thousand tons of coal came into the Cincinnati harbor from Kanawha River points the latter part of the first week in October, making the **largest single shipment of coal that has been brought down from the upper reaches by water since the Ohio River was canalized.** This coal was collected at the mouth of the Kanawha River and was wafted down on the waves created by the lock and dam system on which the government has spent millions of dollars. Eight fleets in all were brought down and nearly all were represented by Cincinnati coal merchants. Some of this coal continued on down the river destined for Louisville and midway points, but the most of it was either transferred directly to the rails or went into stockpiles at Cincinnati. Coal men point to this as a clear indication of the price having at last hit below the cost of production even to mines that have the least overhead to bear.

The Whittier-Crockett Coal Co., of Columbus, has installed a $60,000 tipple at its mine near that city. It will handle 2,500 tons of lignite daily.

OKLAHOMA

Bituminous coal mines of Oklahoma produced 2,802,551 tons of coal valued at $11,527,000, during 1922, according to statistics just made public. The McAlester district proved the most productive, with an output of 1,022,242 tons, valued at $4,244,000. The value of the coal produced in the other fields is as follows: Coal County, $371,000; Lattimer County, $903,000; LeFlore, $851,000; Okmulgee, $3,340,000; Tulsa, $986,000, and Craig, Haskell, Muskogee, Rogers, and Wagoner Counties, $837,000. The average value of the Oklahoma coal was $4.11 per ton, and the number of miners employed during the year was 7,828, of whom 6,500 worked underground. The average number of days during the year worked in the McAlester district was 128, while the average for the entire state was 114. The conversion of many railways and industrial plants to crude oil-burning types of boilers has given the coal-mining industry a distinct setback, but the depletion of oil stocks and a let-up in drilling operations give the coal mining industry a brighter outlook.

PENNSYLVANIA

The Mahoning Coal Co. has declared a dividend of $10 on the common stock, payable Nov. 1, to stock of record Oct. 22. This makes $30 a share declared so far on the common stock this year.

Jas. M. McIntyre & Co., of Rommell, have contracted with the Roberts & Schaefer Co. for a complete steel tipple and reinforced concrete screening bin to be built at their mine at Rommell. The tipple will be complete with dumps, crushers, conveyors and rescreening plant.

The Winstead Coal Co., of Uniontown, **will open a new mine** in the Eighth pool, Monongahela River, where the company has 96 acres of coal, the seam of which is said to be 7 ft. thick. The opening will be made about 500 ft. above Lock No. 8 on the right bank of the river.

Employees at two collieries of the **Glen Alden Coal Co.**, who walked out last Oct. 6, protesting that they had not received the 10-per cent increase in wages granted under the terms of the new agreement, returned to their places Oct. 9. They decided to leave the adjustment of their grievances to union leaders. A third Glen Alden colliery was still idle, but it was expected the differences there would be speedily adjusted.

The general grievance committee representing the **union mine workers of the Hudson Coal Co. voted Oct. 9 to call off the strike** which had been in effect at nineteen of the company's twenty-two collieries and authorized the resumption of work Oct. 10. More than 19,000 men were affected. The committee decided to present its grievances in regular form, first to the district union officials and finally to the anthracite board of conciliation for adjustment. This action was taken on advice of officials of the United Mine Workers, who had declined to sanction the walkout. Production was curtailed approximately 60,000 tons by the two-day strike, which company officials declared was a violation of the new wage contract.

The Pittsburgh Steel Co. has called a special meeting of stockholders for Oct. 30 to vote on the **proposal to transfer all the coal and coke properties of the company to the Monessen Coal & Coke Co.**, all the stock of which will be sold for the present by the steel company.

The three judges of the Common Pleas Court of Schuylkill County **started hearings** Oct. 8 **on the appeal of the coal companies from the triennial assessment of 1922.** All of the big coal land owners are represented in the appeals, the Reading Girard Estate, Lehigh Coal & Navigation, Madeira Hill, Lehigh Valley, Susquehanna Collieries Co. and Calvin Pardee holdings being represented by a score of attorneys. The court will hold continuous sessions on the appeals which originated in every township and borough in which there are coal holdings and it is estimated that a month will be required to hear the various appeals The companies are appealing from a change in the taxation of coal lands from $62,000,000 to approximately $500,000,000. C. A. Snyder, State Treasurer, is heading the legal corps of the County Commissioners while Cyrus G. Doerr of Reading, and A. L. Williams of Wilkes-Barre, are among the attorneys representing the coal companies.

Thomas Kennedy, of Hazleton, president of District No. 7, United Mine Workers, has been appointed a member of the State Welfare Commission by Governor Pinchot.

The Oliver & Snyder Steel Co. has closed down its Oliver Nos. 1 and 2 plants near Uniontown, leaving the No. 3 plant running. **The Champion-Connellsville Coke Co.** also has closed down its plant near Brownsville.

The two properties of the American Coke Corporation, in Fayette County, which were advertised to be sold at receiver's sale on Oct. 4 **were bought by W. M. Robinson**, of Pittsburgh, member of the law firm of Reed, Smith, Shaw & Beall representing the Union Trust Co., American No. 1 plant, composed of 142 beehive coke ovens, about 30 acres of available unmined Pittsburgh or Connellsville seam coal, and machinery, plant and dwellings, sold for $125,000. American No. 2 plant, composed of 240 beehive coke ovens, 170 acres of Sewickley seam coal and 17 acres of Pittsburgh or Connellsville

seam coal, with machinery, plant and dwellings, sold for $75,000. No. 1 plant is located at Linn, near Brownsville, on the Pennsylvania R.R. and has been working off and on for the past few months, but was closed down by the new owner. No. 2 plant is at Martin, near Masontown on the Monongahela R.R. It has been idle for several months. The Orient plant will be sold Thursday, Oct. 25, and consists of 480 beehive ovens and 401 acres of Pittsburgh or Connellsville seam coal, with elaborate machinery and a large number of dwellings.

TENNESSEE

T. C. Miller has resigned as mine superintendent for the Sterling Coal & Coke Co. of Mauring, to accept the general superintendency of the Storm King Coal Mining Co., of Storm King, Ky.

UTAH

The Union Coal Co. has filed articles showing capital of $500,000. The company takes over Carbon County property. C. N. Strevell, Salt Lake City, is president. He owns 498,000 shares of the stock. W. B. Outcalt is secretary-treasurer of the company.

Title to what some regard as one of the richest undeveloped coal sections in the state has been cleared by a decision just handed down by Ell F. Taylor, register of the local land office. The Lund family, of Salt Lake City, descendants of the late Anthony H. Lund, high official of the Mormon Church, are favored by the decision. The Lunds applied for patent to the land following its survey in 1917.

The majority stockholders of the Lincoln-Kemmerer Coal Co., Ogden, were prohibited in an order issued by District Judge Barker, of Ogden, **from disposing of the company's property** in Wyoming until after a hearing on Oct. 15. This hearing was for the purpose of deciding whether or not a receiver shall be appointed for the concern, as requested by the minority stockholders. Petitioners maintain that the defendants have allowed the property to deteriorate by allowing the mine to fill with gas and water and the timbers to rot, for purpose of selling to their agents, also that dividends from the property in the past have been diverted.

The Blazon Coal Co., of Salt Lake City, has applied to the Public Utilities Commission for permission to sell $249,000 worth of stock with which to continue development of its property in the Point-of-Rocks district, Wyoming. It is the intention to build a railroad to this property. L. F. Rains, prominent as a promoter of the Columbia Steel Corporation, is president of the company.

The Salt Lake City office of the **Sullivan Machinery Co. removed Oct. 1** from its old quarters in the Walker Bank Building to the Dooly Block, 121 West Second Street. B. B. Brewster is manager of the Inter-Mountain territory, comprising Utah, southern Idaho, eastern Nevada and western Wyoming.

VIRGINIA

The Chesapeake & Ohio Coal & Coke Co. has sold its mines at Stonega, and will discontinue the operation of its Norfolk office Nov. 1, it has been announced. J. R. Routten, Norfolk manager, expects to go to New York to enter the home office of the company.

Offices of the Fort Dearborn Coal Co. have been moved from the Flat Iron Building to the Law Building, Norfolk, in order to be in the center of the business district. **The Central Pocahontas Coal Co.'s** offices have been moved into the Law Building, also.

WASHINGTON

Washington coal mining is the third largest industry of the state with between 5,000 and 6,000 men employed and with a normal payroll of $11,000,000. The industry absorbs about $9,000,000 worth of timber and mine supplies each year. Coal is mined in eight counties. The largest area of coal is in the Cle Elum district, where there is estimated to be 10,000 acres, according to a writer in Seattle.

WEST VIRGINIA

The coroner's jury at the investigation into the explosion at the Benwood mine of the Wheeling Steel Corporation late in September, conducted by the State Mines Department of West Virginia and by the County of Marshall, brought in a verdict that **the explosion was due to unknown causes.**

Denial is made of the report that there has been any general effort on the part of operators in the Logan field to revise wages downward, although some companies are understood to have made a reduction for a short period at least. There does not appear to have been any general reduction made in the mining fields of southern West Virginia, however. In some of the non-union fields in the northern part of the state, however, **it has been necessary to reduce wages to the extent of about 20 per cent in order to continue operations,** but such a cut does not appear to have been general to non-union territory, although the fact that the present selling price is below the cost of production.

The sum of $200,000 was involved in a deal in coal land in Logan, Mingo and McDowell counties in which Sheriff Don Chafin of Logan County, one of the best known figures in southern West Virginia, figured as one of the principals, when a large block of coal land was acquired from Maynard Stiles, Hattie Dixon and Thomas Bullock, of Los Angeles. There are two seams of coal underlying the land, one being 4 ft. thick and the other 7 ft. thick. This is said to be one of the largest pieces of undeveloped coal land which has changed hands in southern West Virginia in a long time, constituting the last remnant of the famous King land grant, which was in the courts under litigation for so long a time.

Plans for maximum production with minimum use of mine workers have worked out satisfactorily at the plant of the Hardy Coal Co. on the Norfolk & Western, where there are about 6,000 acres available for development. The company shipped 2,000 tons in May, 10,000 tons in June, 18,000 tons in July, 23,700 tons in August and 27,000 tons in September and expects to produce at the rate of 50,000 tons a month by April next. It is stated that with a little further construction work it will be possible to mine and ship coal at the rate of 1,000,000 tons a year. The mine is said to be one of the best equipped mechanically in the country. Although in operation a short time, the Hardy mine ranked tenth among a total of three hundred mines on the Norfolk & Western during September.

After smouldering for 18 months, **a mine fire at the No. 2 mine of the Boone County Coal Corporation** at Sharples **has at last been extinguished.** Although the fire did not cover a wide area nor burn very fiercely, yet it proved to be exceedingly stubborn owing to the fact that after frequent sealings, the air was still able to filter through the roof, furnishing just enough oxygen to keep the fire going. It was only recently that the sealing shut off all air and then the mine was flooded late in September. Little damage has been done the mine.

Although the strike at the Lowesville plant of the New England Fuel & Transportation Co. involving about 350 miners apparently was settled Oct. 3 after they had been on strike a week, **the men were called out again on Oct. 6.** The men walked out late in September because the company desired them to bore three holes before shooting down the coal. The men returned to work and agreed to drill three holes, but remained at work only a few days, when they were called out. On Oct. 8 an agreement was reached between sub-district officials and the management **to arbitrate the differences** between the men and the company.

The Minok coal mine, idle for some months, pending improvements, is now ready for work. The headframe has been extended, making the top about 100 ft. high. This addition will permit the installation of new sheave wheels in a short time. Two new 1¼-in. steel hoisting cables have been installed. A new deep well pump with cylinder 600 ft. down has been installed. A concrete floor of a 500-ton lump coal pocket is soon to be laid.

WASHINGTON, D. C.

An insistent demand has arisen in the coal-mining sections of the country for more precise knowledge in connection with the use of electricity in coal mines. Since the problem is a national one and involves the safety of large numbers of men working in mines, **it is urged that the federal government should provide the funds to undertake the necessary study of the problem,** which is becoming more and more acute. Alternating current is being used to a greater extent in coal mines, because of the economies of transmission which are not possible when direct current is used. Mines are becoming more extended and the use of electricity is increasing with the result that the cost of this item is becoming a factor and is resulting in many properties being changed over from direct to alternating current. The number of accidents has increased materially with the more general employment of alternating current. The point has been reached where mine inspectors are in doubt as to the advisability of allowing the continuance of the use of alternating current. Mine operators, to whom a change in the electrical system means large expenditure, are of the opinion that the relative danger of the two forms of current should be established before any drastic regulations are put into effect.

The case of the **Federal Trade Commission vs. the Claire Furnace Co. has been given a special preference** by the U. S. Supreme Court. It will be argued before that Court on Dec. 3. In the case of the **Corona Coal Co. vs. the United States,** the Court calls upon the coal company to show cause why the appeal should not be dismissed.

The U. S. Supreme Court has been asked to review the case brought against the Pittsburgh & West Virginia Coal Co. and others by the Canute Steamship Co., Ltd. An adjudication in bankruptcy against the Diamond Fuel Co. was approved by the Circuit Court. The steamship company is a creditor of the Diamond Fuel Co. and has attached certain property of the coal company at Baltimore.

Quite contrary to the usual custom, the Supreme Court of the United States has **reopened the case of Pennsylvania vs. West Virginia,** in which the court held that local consumers are entitled to no preference in the use of gas in its flow through interestate pipe lines.

CANADA

The British Empire Steel Corporation reports September coal production at 412,850 gross tons as compared with 425,044 for September, 1922. Production for the first mine months of the year was 3,924,628 gross tons as compared with 2,836,352 tons for the corresponding months of 1922, an increase of 1,088,276 tons.

J. D. Galloway, provincial mining engineer for the northeastern division of British Columbia, **just returned from a tour of inspection in the Peace River region,** reports that the known coal area at Rocky Mountain Canyon is 40 by 60 miles in extent. The grade of the coal is semi-anthracite, and is markedly lower in ash than the majority of the Western coals. As a rule the seams are small, but there are an appreciable number of commercially workable seams. A shipment of 40 tons has been sent by water to Peace River Crossing, consigned to the Canadian Pacific Ry., which will give it a practical test to determine its steam-raising qualities. Mr. Galloway stated that if transportation difficulties were overcome he believed the coal would compete with Pennsylvania anthracite in Ontario markets. Mr. Galloway stated that he found the people much opposed to comparatively recent legislation reserving coal and oil lands, thus making it much more difficult to obtain coal and iron leases.

Definite steps have been taken in the Canadian province of Alberta to protect coal buyers against deception in the fuel they get. **The government has enacted a law aimed to prevent substitution of poor coal** for good by requiring the trade name, mine of origin, class and grade of every coal shipment to be recorded on all documents involving the coal. Fine and imprisonment up to six months are the penalties for infraction.

Alberta coal is in demand in Ontario, according to press dispatches. It is stated that in the City of Windsor, Ont., the City Hall was stormed by hundreds of citizens anxious to obtain some of the Western coal, which was being offered at $14.50 a ton. In order that the distribution might be fair the authorities were compelled to limit each applicant to one ton. The regular price of coal at Windsor, it is said, is $20 a ton and it is difficult to get at that price.

Forty-six tons of semi-anthracite from the Peace River country in the vicinity of Hudson's Hope have been delivered by scow to the Canadian Pacific Ry. to be used as a test of its steaming qualities in the locomotives of the E. D. & B. C. Ry., a subsidiary of the C. P. R. running into Edmonton. If it is a success, of which there is no question in the minds of the members of the coal company, it will mean the establishment of a new coal industry in northeastern British Columbia. Neil Gething, W. Gathing, L. Gething, and Leslie Aylard, all of Hudson's Hope, are the promoters of the enterprise.

Obituary

William Harrison Conkle, 69, prominent pioneer coal operator of Sullivan County, Indiana, died at his home recently of a complication of diseases. He became suddenly ill the day before and his condition became rapidly worse, finally developing into double pneumonia and heart trouble. Mr. Conkle was born in Beaver County, Pennsylvania, Oct. 5, 1854. Surviving are the widow, two daughters, Mrs. Tine Huff and Mrs. Max Crowder, of Sullivan, and one son, W. E. Conkle, of Pekin, Ill.

Thomas Cunningham, 76, died recently at his home in Edwardsville, Ill. For the past 20 years he had served most of the time as county mine inspector for Madison County. Born in Scotland, he took up coal mining as a boy and came to Illinois at the age of twenty. He celebrated his 53rd wedding anniversary last December. Besides a widow he leaves five children.

Recent Patents

Water Filters and Filtration Equipment. The Permutit Co., New York City. Bulletin 105. Pp. 23; 8x11 in.; illustrated. Covers the theory and practice of modern filter design and construction. Method of operation is shown by detail drawings.

Sullivan Machinery Co., Chicago, Ill., has just issued the following bulletins: **Rotator Hammer Drills.** 81-B. Pp. 31; 6x9 in.; illustrated. Describes new line of rotator drills redesigned to obtain increased drilling speed. **Ironclad Overcutter, Class CE-11.** Bulletin 79-H. Pp. 7; 6x9 in.; illustrated. A new type of machine is described for mining out dirt bands or partings midway of the coal seam so as to prevent mixing the dirt or impurities with the clean coal when it is loaded out. **"WA-6" Air Compressors.** Bulletin 77-G. Pp. 7; 6x9 in.; illustrated. Describes single-stage steam-driven straight-line air compressors. This bulletin is a reprint of a former edition. **Drill Sharpeners.** Bulletin 72-H. Pp. 32; 6x9 in.; illustrated. Describes the drill-steel sharpening machines of two types and their adaptation to making different classes of drill bits and drill shanks on solid and hollow steel.

Trade Literature

Type AA Reliance Induction Motors. Reliance Electric & Engineering Co., Cleveland, Ohio. Bulletin 5018. Pp. 14; 8x10 in.; illustrated. These motors are for two and three-phase alternating-current circuits. Details of construction are outlined.

Bristol-Fuller Controller Valve. The Bristol Co., Waterbury, Conn. Bulletin No. 319. Pp. 15; 8x10 in.; illustrated. For use with automatic temperature-controlling apparatus to control the flow of air and gas, steam, oil and other liquids. Describes some of the variations for which this equipment can be supplied.

Lopulco Pulverized Fuel Systems. Combustion Engineering Corp., New York City. Catalog L-I. Pp. 11; 8x11 in.; illustrated. Describes both the theory and mechanical features of the powdered-coal system installed by this company in some of the boiler plants in this country, and includes a section through a Lopulco-equipped boiler plant showing all the different elements of the system.

Type "AR" Squirrel-Cage Induction Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin 1118-B. Pp. 10; 8x11 in.; illustrated. A feature of these motors is the use of cast steel in place of cast iron wherever practicable.

A new illustrated circular just issued by the Davenport Locomotive Works, Davenport, Iowa, illustrates the **various types of steam locomotives** of large and small gage. This company specializes in locomotives for mine and contract work and has incorporated many new features of design in its locomotives that will prove interesting to the coal-mining engineer.

Two new bulletins of interest have just been published by the Atlas Powder Co., of Wilmington, Del. **"Move Your Oldest Stock First"** is the title of one which explains the advantages of stocking explosives in such a manner as to move the oldest stock first and thus always have the advantage of new supplies. This arrangement obviates the necessity of discarding any old supplies which may deteriorate with age. The second bulletin is on the subject of **"Small-Diameter Dynamite Cartridges Inferior."** This is an extract from the Bureau of Mines Report by S. P. Howell and J. E. Crawshaw. This bulletin shows that as the diameter of cartridges of dynamite, gelatines, permissibles and other high explosives is reduced the velocity, sensitiveness and efficiency also are reduced and the objectionable fumes given off when the explosion is detonated are increased. The loss in strength or efficiency is due to partial or incomplete detonation resulting from insensitiveness.

Bulletin No. 43976 of the General Electric Co. covers **Charging Equipment for Motive Power Storage Batteries.** This bulletin describes charging equipment which has proved reliable and satisfactory in service. There are two classes of apparatus described in the bulletin: (1) Individual battery charging motor-generator sets with switchboards for Edison or lead batteries for (a) Non-automatic or (b) Automatic operation; (2) motor generator sets with switchboards for charging two or more Edison or lead batteries for (a) Non-automatic or (b) automatic operation. Due to the varied nature of the sizes of the batteries to be charged, of the requirements to be met in different localities, of the methods of charging, etc., no attempt has been made in this bulletin to show any but a small proportion of the equipment that is manufactured by this company.

"It Pays to Keep Boiler Tubes Clean" is the title of a new pamphlet recently put out by the Heine Boiler Co., St. Louis, Mo. A most interesting statement on heat transmission in this pamphlet is to the effect that tests have shown that one-fiftieth of an inch of scale deposited on steel plates reduce the rate of heat conduction 60 to 75 per cent. In addition, the scale prevents rapid transmission of heat to the water, thus causing the tubes to become overheated and their life greatly shortened. Mud deposited on the heating surfaces results in lower heat transmission—fuel waste—overheated and bagged tubes. It pays to keep boiler tubes clean.

The Rome Wire Co., Rome, N. Y., has issued the following bulletins: **Super Service Cord and Cable.** Pp. 16; 7x10 in; illustrated. Size of gage, stranding, capacity amperes, diameter of two- and four-conductor cords, three-conductor and single-conductor flexible cable, concentric, two-conductor cables and parallel duplex mining cables are given. **Super Service Junior Cord,** especially adaptable for mine, telephones and other mine equipment is covered in this bulletin and also in a 3x6 four-page folder. **Welding Cable,** declared to be absolutely waterproof, is described in the 7x10 in. bulletin and in the smaller one, which also gives prices.

Gas Conditioning for CO_2 Recorders. Uehling Instrument Co., Paterson, N. J. Bulletin 116-A. Pp. 7; 9x11 in.; illustrated. Describes the "Pyro-Porus" filter, gas drier and gas purifier, three simple devices which are claimed to completely eliminate soot, moisture and sulphur. Small bore seamless-drawn tubing used for the gas sampling line also is described.

Hose Fittings. Schlangen Bros. Co., Chicago, Ill. Pp. 43; 6x9 in.; illustrated. Covers nozzles, sprinklers, connections, clamps, couplings, bushings, valves. The bulletin has an attractive appearance, being bound in heavy brown paper.

The Osgood Co., of Marion, Ohio, has recently issued Bulletin No. 236. This is in the form of a four-page folder illustrating and describing its new 1¼-yd. heavy duty steam shovel.

Association Activities

The board of directors of the **Central Pennsylvania Coal Producers' Association** and the executive committee of the **Association of Bituminous Operators of Central Pennsylvania** met Tuesday, Oct. 9, at the Lincoln Trust Building, Altoona, and re-elected B. M. Clark of Indiana, Pa., president; G. Webb Shillingford, of Clearfield, vice-president, and Charles O'Neil, of Altoona, secretary-treasurer of both organizations. John C. Forsythe was re-elected commissioner of the Association of Bituminous Operators and W. A. Jones was re-elected statistician of the Coal Producers' Association. Conditions in the field were considered in an informal discussion, one of the subjects taken up being the negotiations for a new scale that must be framed to take the place of the one that expires on April 1, 1924. The coal business is decidedly dull in the district at present, the general opinion among the operators present being that it is due to overproduction, the extended use of fuel oil by the shipping interests and by the gradual development of electric power in the New England states, where there always has been a good market for central Pennsylvania coal. Operators present at the meeting who have visited the New England states recently declared that electric-power plants are springing up along the various rivers and the promoters contend that because of strikes in the coal regions, high freight rates and the tying up of the railroads during the extreme weather of winter, coal is becoming too expensive and the supply too uncertain. It also was reported that the use of oil as fuel is increasing by leaps and bounds and is adversely affecting the coal industry. It was shown that prices at the mines are so low now that there is no profit in the business.

Traffic News

The movement of freight cargoes through **the canals at Sault Ste. Marie during September totaled 12,776,048 net tons,** according to the monthly report of the U. S. Engineer's Office, as compared with 10,986,056 short tons in September last year. The movement of coal upbound was 1,945,344 net tons of bituminous and 73,461 net tons of anthracite compared with 2,353,745 net tons of bituminous and 10,805 net tons of anthracite in September a year ago.

A complaint against the present level of railroad rates on coal from Illinois, Indiana and Kentucky to Iowa cities was filed with the Interstate Commerce Commission Oct. 10 by the Iowa Board of Railroad Commissioners. Consuming territory of Minnesota, Wisconsin, Illinois, Missouri and Indiana, the petition said, has more favorable rates on coal than Iowa. The commission was asked to institute an investigation to fix a fair rate level.

Rates on coal from the Crescent group in West Virginia and Kentucky from the Pocahontas field and from other producing areas to various consuming points in Indiana have been **attacked in a score of complaints** filed Oct. 6 with the Interstate Commerce Commission on behalf of various Indiana consumers.

On Sept. 28 the **Interstate Commerce Commission closed its hearing of the Louisville & Nashville R.R. and Atlantic Coast Line R.R. for exercising an agreement for a 999-year lease on the Carolina, Clinchfield & Ohio R.R.,** which is opposed by the Seaboard Air Line and other Southeastern railroads, which fear a monopoly. The Commission has given those interested until Oct. 29 to file briefs, for final argument of the case.

It was reported from Pineville, Ky., Oct. 4, that work had started on another 18-mile section of double track on the Cumberland Valley Division of the Louisville & Nashville R.R., several sections of which have been double tracked, in the plan of making this division a double-track affair from Corbin to Loyal, in an effort to give better service to tonnage from Bell and Harlan County fields. A 17-mile section of the Eastern Kentucky division of the road into the Hazard field also is under double track construction. If the L. & N. obtains its Clinchfield lease it will be in excellent position to give fine service to the shippers after connections are made from the Eastern Kentucky and Cumberland Valley divisions to the Clinchfield.

Coming Meetings

The West Virginia-Kentucky Association of Mine, Mechanical and Electrical Engineers will hold its annual meeting Oct. 19-20 at Huntington, W. Va. Secretary-treasurer, Herbert Smith, Robson-Prichard Bldg., Huntington, W. Va.

American Welding Society. Oct. 24-26, Pittsburgh, Pa. Secretary, M. M. Kelly, 33 West 39th St., New York City.

Harlan County Coal Operators' Association. Nov. 21, Harlan, Ky. Secretary, E. R. Clayton, Harlan, Ky.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

Second National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York City, Dec. 3-8. Managers, C. F. Roth and F. W. Payne, Grand Central Palace, New York City.